

SPATIAL EVOLUTION OF URBAN VILLAGES IN SHENZHEN

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Spatial Evolution of Urban Villages in Shenzhen

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(met een samenvatting in het Nederlands)

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To Huilin and Jianhua

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This book has taken shape over the last four years but has its roots in the summer of 2006. When surveying the land use in Shenzhen, I was fascinated to see so many people and activities all fit in together in urban villages. Each of these villages, while engulfed in the urban landscape, is an intricate and delicate niche that houses a large migrant population and a vibrant economy. After my MSc study in 2007, I was encouraged by my supervisor Qingming Zhan to pursue a PhD in the Netherlands, and this was later realised after being awarded the CSC–Utrecht University PhD fellowship. I thereby started my exploration of the evolution of urban villages—the exuberance of their spatial and social diversity, and what creates and destroys it—what this book is essentially about.

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1

INTRODUCTION

1.1 Background

China is an increasingly industrialized and urbanized country with an estimated 666 million people, or nearly half its population, now living in urban areas, an increase of 13 percentage points over the 2000 figure (Peng, 2011). Its urban built-up area has tripled in two decades, from 12,462 km² in 1989 to 38,107 km² in 2009 (National Bureau of Statistics of China, 1990; 2010). Rapid urban expansion has been a major contributor to the loss of around 124,000 km² of arable land (a 10% loss) between 1980 and 2008 (Peng, 2011). As peri-urban agricultural areas are also usually heavily populated, many rural village settlement areas have been engulfed by this expansion, forming village-like enclaves within the new urban landscape. These so-called urban villages¹ (or *chengzhongcun* in Chinese), which are a prominent and important feature of China's new urbanism, are the focus of this research.

The inherent complexity of urban planning poses two pivotal challenges. First, the basic objective of the planning process is not well understood. There are many objectives, which may not be readily compatible, and may even be contradictory.² Second, planning involves facilitating human processes that are not well understood, resulting in much uncertainty (Hall, 2002). In order to meet these two challenges, it is necessary to adopt a balanced, integrated perspective on urban development that considers all three aspects of sustainability: economic prosperity, social equity, and environment; and on the other hand to embrace new knowledge and respect specific local contexts in practice.

¹ In western literature, the term 'urban village' often refers to the urban planning concept that aims to create communities that are environmentally friendly and self-sustainable (Chung, 2010; Liu, et al. 2010). However, in this research, the urban village refers to the village settlements located within urban built-up areas.

² For example, road extension enhances transport but harms the environment; high-rise buildings consume less land but more energy.

To contribute to better planning practice in the developing world, this research explores informal urban development in the Chinese context by a study in Shenzhen. The phenomenon of a form of migrant housing is examined. The urban village is a by-product of China's rapid urbanization; however, it has unexpectedly become a remarkable housing market that provides the most affordable and accessible housing for rural migrants. With the dramatic growth of cities, the spatial evolution of urban villages occurs as a profound historical process. This research aims to understand this process, based on a combination of fieldwork investigation, theoretical examination and spatial analysis of empirical data. In this chapter, the background, the research objective and questions, and the relevance and contribution of this research are presented.

1.2 Urban village

Driven by market forces and the government's reaction to the marketplace, the spatial growth of cities is sustained (Yeh and Wu, 1999; Zhang, 2000; Lin, 2007; Ke et al., 2009). As cities expand, their governments have to rely on the transformation of rural land to urban land to provide adequate space for urban development. In this process many rural villages have been encompassed or annexed by newly developed urban territory, forming urban villages (Figure 1.1). Due to the loss of farmland, the traditional agricultural way of life of the indigenous population is abandoned. The resulting landless farmers thus need alternative means to make a living, and the retention of their villages' housing areas provides an opportunity to do so. Extensions are made to existing houses and new houses are built and rented to migrant workers. Local farmers thus take advantage of their villages' prime locations and exploit them via highly profitable room-rental businesses.

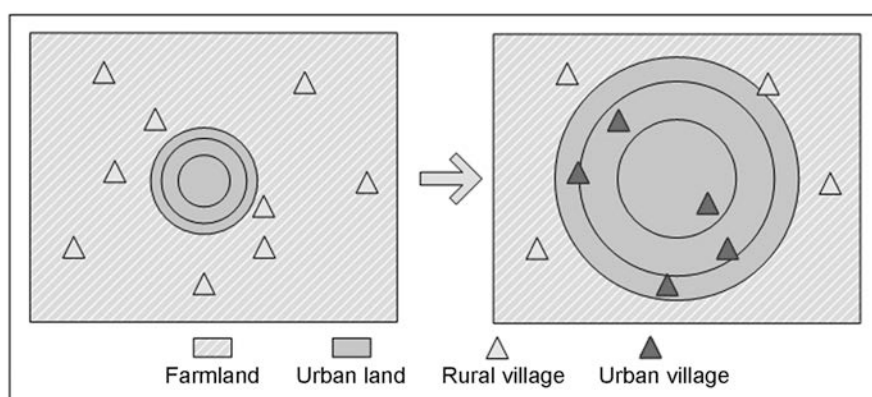


Figure 1.1 The transformation of rural villages to urban villages.

Meanwhile, rural migrants have been flooding into cities' booming manufacturing and service sectors. Being rejected from official urban residency (known as *hukou*), these migrants are excluded from the formal housing market (Wang, 2000; Wu, 2004a). They are thus forced to seek accommodation in urban villages by virtue of their affordability and social accessibility (Zhang et al., 2003). In China's urban transition, while the government neglects the livelihood of the two most vulnerable groups—the landless peasants and the rural migrant workers—urban villages have undeniably contributed to alleviating the problems of the unemployment of the former and the accommodation of the latter.

In many cities, urban villages serve as an indispensable sub-market of urban housing. However, their development is not regulated by any form of centralized urban planning due to the rural status of urban village land. Many urban villages are heavily populated, overdeveloped and lacking infrastructure. Urban authorities and formal urban citizens generally hold a negative view of urban villages (Zhang, 2005; Tian, 2008), regarding them as 'eyesores' and 'backward places', and blaming them for inefficient and chaotic land use that hampers the process of 'modernization' (Wu, 2009). As city authorities perceive urban villages as more of an urban governance problem, restoration of local government control over urban villages is therefore seen as politically important and essential in respect of both political credibility and city development progress. These concerns lead to constant endeavour and actions to demolish and redevelop many urban villages. Cities including Guangzhou, Shenzhen, Wuhan, Xi'an, and many others have introduced large-scale programmes for urban village redevelopment.

1.3 Problem definition

Urban planning in China is a predominantly top-town process, with zoning and administrative policies being the main means for planning at different scales (Yeh and Wu, 1999; Abramson, 2006). However, being outside the urban administration system, the development of urban villages is neither monitored nor regulated by planning authorities. Over time, environmental and social problems associated with urban villages accumulate, which lead to the government's negative view on urban villages and their increasingly stronger determination to eliminate the villages. Although urban village redevelopment programmes are underway in many cities, such radical elimination might result in more problems than it solves (Wang et al., 2009).

Some empirical studies provide solid reasons for the choice of migrants to live in urban villages (Wong et al., 2007; Song et al., 2008). And some other research examines the government policies on urban villages and discusses their

implications (Chung, 2009; Hin and Xin, 2011). Besides, some scholars and planners believe that the urban village is just a temporary phenomenon, which will diminish over time as the cities continue to develop in terms of their overall socioeconomic status (Li, 2004; Yan et al., 2004). Nonetheless, most scholarly work holds a positive view on urban villages and argues that urban villages are necessary for contemporary Chinese cities (Zhang, 2005; Song et al., 2008; Wu, 2009).

The dichotomy between the two main views on the urban village remains and the gap is widening. Although recent debate and literature have raised public awareness and advocate a more tolerant solution, they have not been able to provide an alternative option for the future of urban villages. Moreover, the exploration of such planning and policy options is hindered by the absence of necessary knowledge on the development of urban villages. There is little understanding of how urban villages evolve spatially; whether and how such development is influenced by planning and development of their formal urban contexts; and what the social and spatial implications of the development of urban villages are or may be in the future. All these questions form a knowledge gap that should be bridged before any competent solutions can be devised. Improved understanding of the phenomenon and its development processes are both useful and necessary if timely interventions are to be made to prevent excesses often associated with over-development in urban villages.

1.3.1 Scientific relevance

Although the urban village phenomenon attracts wide attention, most literature has either focused on exploring the theoretical mechanisms of their emergence (Zhang et al., 2003; Zhang, 2005; Tian, 2008) or on studying specific villages to illustrate their physical and social status (Wang et al., 2009; Bach, 2010; Liu et al., 2010). Some studies have described the context of urban villages by elaborating from the perspective of the Chinese land and housing system (Wang and Murie, 2000; Zhang et al., 2003; Friedmann, 2005). Social and demographic research has elucidated the remarkable rural-to-urban migration process, indicating the inevitability of the emergence of urban villages and their development in cities to satisfy huge housing demands (Wu, 2004a; Wong et al., 2005; Siu, 2007; Zhu, 2007; Bach, 2010). Essentially, past studies have acknowledged the supportive role of urban villages, suggesting that—at least in the short term—urban villages should remain as a realistic and effective solution for the provision of affordable housing. However, despite the interesting insights and important implications of these studies, there are two important limitations.

First, in urban village studies, there is a tendency to adopt the stereotypical view of the urban village as a simple, static and homogeneous migrant enclave. However, in reality, once incorporated into the urban context, urban villages evolve spatially to provide more housing units, and vary functionally to cater for the changing demand for room space. Human behaviour in different urban villages tends to be diverse in nature as they shift from agricultural production to room-renting and other socioeconomic activities. The development of an urban village reflects the multiple needs and demands of the people that live and work there, and these are related to their formal urban context. As a result, urban villages evolve differently, largely due to their diverse urban contexts, and this shapes a heterogeneous urban village housing market. The ignorance surrounding the spatial evolution of urban villages and their resulting diversity hinders our understanding of their dynamic and diverse nature, which is likely to mislead our pursuit of sustainable urban village policies.

Second, urban villages are usually studied in isolation, and the strong linkage with their formal urban environs is disregarded. Yet, there are mutual dependencies. The formal urban development around a village generates employment, consumer markets and the improvement of infrastructure, all of which greatly influence the development of the urban village. The consequential reactions in the urban village, i.e. physical growth and socioeconomic transformation, are triggered by the development of the formal city. Similarly, the development of the village also influences its environment. Knowledge of these relations is important to better incorporate urban villages in the city, but as yet it remains largely unknown. In this circumstance, a dilemma arises that, while the unplanned growth of urban villages and the planned development in their environs influence each other, the top-down planning process and the bottom-up urban village growth are hardly correlated. Solving this dilemma requires an integration of urban village programmes with general urban development plans and policies. A prerequisite to achieve this is to understand the urban village in respect to its urban context.

To address these two limitations, this research examines the development of all urban villages in a large metropolitan area with a time span of 10 years. This analysis enables a deeper understanding of the urban village as a rather complex, dynamic and heterogeneous urban phenomenon. Through exploring the dynamics of urban villages, not only is their process of evolution and its resulting spatial and social diversity revealed, but also the relationships between the development of urban villages and the overall growth of the city are understood. Both improve the understanding of the development and position of the urban village in its urban context. Moreover, all the disparate individual urban villages across space and time affect the overall functioning of the city. Their aggregate outcome, i.e. the pattern of the social and spatial changes at the city scale, represents a very large share of the urban growth that significantly

shapes the city's overall land use and housing profile. Knowledge on the development of urban villages may therefore contribute to a broad range of studies related to contemporary urbanization in China.

1.3.2 Social relevance

As Chinese cities continue to expand and absorb a massive amount of rural migrants, new urban villages are in the making and existing ones continue to grow. It is evident that urban villages have existed as an important urban component, which facilitates a smooth urban transition of the society. To support a better planning practice associated with urban villages, a thorough analysis of the spatial evolution of urban villages can make a contribution in at least four aspects.

First, in many cities, the implementation of urban village redevelopment programmes faces incredible barriers and many actions result in social consequences, such as conflicts caused by forced eviction and demolition, relocation of landlords, and large-scale displacement of migrant tenants followed by a housing crisis (Zhang et al., 2003; Zhang, 2005; Hin and Xin, 2011). This research may provide new information to help rethink the current urban village policy. Moreover, by providing a citywide perspective of the migrant housing market provided by urban villages, the magnitude of the issues and the potential impact of clearance policies are revealed.

Second, this research provides knowledge to guide and improve urban village development. Currently, dramatic housing demand leads to intensive use of space in urban villages, which leads directly to many negative externalities. Examples of chaotic land use, substandard housing construction, infrastructure deficiencies, and the lack of open space abound and are believed to be associated with social problems, safety risks, and health hazards. Knowledge about the process of spatial evolution in urban villages can help to devise a proactive planning strategy to regulate urban village development. Such negative externalities can thus be minimized through institutional measures and urban villages can become more habitable and sustainable urban neighbourhoods.

Third, this research helps to differentiate between and allocate planning measures and policies based on the specific characteristics of each particular urban village. In current planning practices, the diversity of urban villages is neither a major concern, nor is it well understood by planners. We do not yet fully comprehend the factors that explain the development trajectories of different urban villages, nor do we appreciate completely the scale and scope of their diversity and what implications this may have in terms of the need for, and

the potential of, different types of possible development interventions. A better understanding of the spatial evolution of urban villages and the consequent spatial and social diversity contribute to the development of a typology of the urban village in terms of development status of individual villages. It supports the planning of case-specific programmes that consider the history of development, current state, and future development trends of each urban village.

Fourth, this research helps to develop mitigation measures to cope with potential housing shortages caused by urban village redevelopment. Today, a growing number of cities rely on large-scale redevelopment programmes to solve the ‘urban village problem’. The redevelopment programmes of urban villages will certainly limit the range of housing options for low-income households. Past planning and decision-making have little concern for effectuating a housing market that caters for low-income shelter needs. However, policies to maintain and enhance the variety of housing at the lower end of the housing market are being adopted in more and more cities and its priority is rising on the planning agenda. Although alternative housing options are increasingly being provided, their impact on the low-income housing market is poorly understood. Considering the strong relationship between migrants and urban village housing, understanding the spatial evolution of urban villages across a city helps to assess migrant housing demand at both the city scale and a detailed local scale. Based on this, a scheme of alternative housing, such as via the provision of subsidized social housing, can be prepared to allocate the provision effectively.

To sum up, decisions about urban villages are non-repeatable and have long-term consequences. These decisions will not only affect the lives of urban village residents, but also have an impact on the urban housing market and the general urban land use pattern and performance. It is important to inform planners and decision-makers with long-term analysis that is as accurate as possible. In order to shape future policies and programmes associated with urban villages, knowledge and methods that can enable us to represent, manipulate and assess ideas about urban village development are required. To achieve these goals, understanding the spatial evolution of urban villages is a necessary first step.

1.4 Research objective and questions

This research aims to explain the spatial evolution of urban villages and their resulting socioeconomic and spatial diversity through an empirical study of the city of Shenzhen. The empirical research involving fieldwork, statistical analysis, and modelling has been conducted to answer the following questions:

Q1: How do urban villages emerge and develop in terms of their physical environment and socioeconomic status over space and time?

Q2: Are their specific development phases in the evolution of urban villages that are reflected in patterns and trends at the city scale? If so, what are these patterns and trends?

Q3: What drives the development of urban villages and how can their physical and spatial diversity be explained?

Q4: How do the land use functions of urban villages evolve and what drives their functional change?

By answering these research questions, the process of spatial evolution in urban villages can be understood in terms of its process (Q1, Q2 and Q4), patterns (Q2 and Q4), and mechanism and reasons (Q3 and Q4).

1.5 Study area

This research takes the city of Shenzhen, China, as a case study to understand the development of urban villages, as well as the impact of this development and its implications. An introduction to Shenzhen is presented in Chapter 2.

There are four reasons for selecting this study area. First, the city is the earliest example of a so-called Special Economic Zone (SEZ)³ in China. As an experimental ground for the ‘socialist’s market economy’ for the country, the city is a pioneer of China’s reform and ‘opening up’ to the rest of the world (Ng, 2005). Many reform-related problems and phenomena often emerged firstly in Shenzhen, and then happened in other Chinese cities. The city is thus an ideal case for research to understand China’s social and economic development and transition. Second, Shenzhen is a migrant city where that migrant population largely outweighs the permanent residents. Urban villages, which house most of the migrants, play a vital role in the housing market. Third, as the city was established and developed from scratch, urban villages are now distributed over the entire city. This allows for the exploration of a large variety of urban villages, which are located in almost all sections of the city. And fourth,

³ The Special Economic Zones (SEZs) of China are certain geographic regions that the central government has provided with special economic policies and flexible governmental measures. This allows SEZs to utilize an economic management system that is especially conducive to doing business that does not exist in the rest of Mainland China.

Shenzhen is among the first group of cities that introduced and implemented rigid and comprehensive plans to redevelop urban villages, which enables us to examine the consequences of large-scale redevelopment of urban villages.

1.6 Thesis outline

This thesis is built around a collection of seven papers that have been published or submitted to peer-reviewed journals or edited books. Each of these publications is mentioned at the start of the appropriate chapter. To maintain a consistent style throughout, the abbreviations, names and referencing styles were standardized, and may thus differ slightly from those of the original papers or book chapters. The structure of the following chapters is as follows:

Chapter 2 describes how urban villages have performed as a migrant housing market in Shenzhen and explores the role that urban villages play in extremely fast urban growth.

Chapter 3 explores different dimensions of the development and redevelopment of urban villages in Shenzhen. By linking to the development practice of the city, the physical and socioeconomic changes of urban villages are examined. It explains how urban villages emerge and develop and in the meantime transform their socioeconomic and political structure. It also examines the redevelopment programme introduced and the progress and consequences of the programme implementation (Q1).

Chapter 4 provides systematic analyses of urban village development in Shenzhen in the period 1999–2009. It examines the spatial evolution of urban villages in terms of development phases and identifies and explains the diverse development patterns and trends of urban villages (Q2).

Chapter 5 explores the drivers of urban village development. It explains how and to what extent locational factors, urban development factors and natural and institutional constraints influence the development of urban villages (Q3).

Chapter 6 explores the functional evolution of urban villages. It identifies the land use diversity of urban villages across the city, suggests a generalized land use evolution path of urban villages, and explains the reasons behind the functional evolution of urban villages (Q4).

Chapter 7 summarizes the main findings of the analysis of the spatial evolution of urban villages in Shenzhen, based upon which the implications of this study and a series of policy recommendations are provided. Finally, the limitations of this research are discussed and future research topics suggested.

2

INFORMAL DEVELOPMENT, MIGRANT HOUSING AND URBAN VILLAGES

This chapter is largely based on the following papers:

Hao, P., Sliuzas, R. and Geertman, S. (2010) Race against planning: unplanned urban space in Shenzhen, in: M. Provoost (Ed.) *New Towns for the 21st Century: The Planned vs. the Unplanned City*. pp. 186-195. Amsterdam: SUN Publishers.

Hao, P., Sliuzas, R. and Geertman, S. (2009) Villages within the city: housing rural migrants in the emerging mega-city of Shenzhen, China. *Dialog* 102, pp. 16-20.

Abstract: China's urban villages provide migrants with affordable housing and fundamental utilities. Since urban villages are constructed and maintained on the basis of self-help in the absence of formal regulations, they are—rightly or wrongly—often associated with squalor, overcrowding and social problems. Consequently, official policies aim at demolition and redevelopment of these areas. This chapter explores the role that urban villages play in the fast growing metropolis of Shenzhen. Many urban villages are critical sub-markets of urban housing, providing a realistic and effective affordable housing solution for migrants. The current policy focusing on their redevelopment may lead to immediate and significant housing stress in certain areas, which may, in the long run, impact negatively on the openness and competitiveness of the city.

2.1 Introduction

Since China's economic reform in 1978, spatial expansion of its cities has been sustained as a result of the continuous economic growth and urbanization. The urban development has been encroaching upon rural land and absorbing rural migrant labourers at unprecedented speed and scale, leading to a society in which the urban is interweaving with the rural in both physical and social terms. The two most prominent examples are the existence of the 'floating population'

(Goodkind and West, 2002) and the prevalence of urban villages. While the former refers to the rural migrant labourers who live and work in the city but are excluded from urban residency (*hukou*) and its attached value (Chan et al., 1999; Zhu, 2007), the latter emerge as the residential components of rural villages remain intact during the process of urban development. The story of such urban villages is directly interwoven with that of the floating population.

The creation of the floating population was triggered by the increasingly larger urban–rural income gap, which has developed since the mid 1980s (Zhao, 1999). Hundreds of millions of rural migrants have left their homes for cities for job opportunities and better lives, resulting in a huge labour pool in urban areas. As they circulate among jobs in different cities, rural migrants barely have a chance to obtain an urban *hukou*. Consequently, they are overlooked and excluded from state-funded urban resources such as housing, education, and medical care (Liang and Chen, 2007; Song et al., 2008). Their needs for such services must therefore be satisfied through other means.

In the meantime, the government relies on transforming rural land into urban land to provide new space for urban development, and in the process exacerbates the dislocation of rural populations. By paying compensation to peasants, city governments acquire land from rural villages and prepare the land for urban development. In this process, the government tends to requisition farmland rather than settlement areas so as to avoid costly and time-consuming relocation programmes for the peasants. Consequently, the villages' settlements remain intact while their surrounding environments are dramatically changed.

Over time, the settlements become spatially encompassed or annexed by urban territory, forming urban villages. The indigenous villagers, who have exchanged their farmland for limited compensation, have to find other means to make a living. The government usually entitles dispossessed peasants with an urban *hukou* status and sometimes recruits some for jobs, but those who are without proper education or skills are rejected by urban sectors. Many such villagers become landlords who rent rooms to migrants that are excluded from the formal housing market.

As former farmlands are developed into factories and other urban facilities, urban villages become favourable living places for migrant workers by virtue of their affordability and accessibility to jobs, and the huge demand for low-cost housing from migrants feeds their growth. Economic interests drive the indigenous villagers to increase floor space by expanding plot areas, adding new storeys to existing buildings, and redeveloping the buildings into bigger and taller ones. By doing so, their rental profits rise dramatically. The outward and upward expansion of buildings, especially in well-located villages, becomes a prominent trend.

This chapter provides a contextual backdrop for the exploration of the development of urban villages in Shenzhen. It examines the role that urban villages play in the city and their physical and social variations in different city districts. Thereafter, the newly introduced redevelopment plan is examined to shed light on its potential consequences.

2.2 Informal development

Urban villages, due to their unofficial and illegitimate characteristics, are generally viewed as a form of informal settlement in China (Zhang, 2005; Wang et al., 2009). Under China's dual land system, rural land is collectively owned by rural villagers, and urban land is by definition state-owned. The system of collective ownership of village land does not allow villagers to alienate their lands, other than to transfer ownership to the government. However, the specific occupancy of a house plot has turned each village family into a *de facto* landlord with unrestricted tenure (Zhang et al., 2003). As a result, the indigenous urban village residents can take advantage of their land's prime location and exploit it via highly profitable room rental to migrants. Unlike the development of urban land that is scrutinized by urban planning and regulation, development projects in urban villages are unregulated. Indigenous villagers are thus able to provide sub-standard housing and services. This not only substantially reduces the construction and management costs, thus enabling low rent, but also allows quick and massive constructions that provide large quantities of housing units to satisfy the increasing demand (Figure 2.1).

Urban villages also provide a lot of informal economic activities besides housing, such as street stalls, food markets and low-cost personal services. All over the world, this is a key feature of such informal settlements, which provide shelter but also other support services for their populations. However, in urban villages, both dwelling and non-residential buildings are developed at a much larger scale. Apartment buildings with 10 storeys are common (Figure 2.1), while some buildings are erected up to 20 storeys high. Besides, numerous dedicated industrial buildings, commercial and service facilities are developed, all of which cater for the local demand for space for various economic and social activities (Figure 2.2). On the one hand, such activities help to transform urban villages into multifunctional neighbourhoods, thus enabling a diverse and self-contained local economy; but on the other hand, the sometimes chaotic mix of land uses and incompatible activities may lead to severe environmental and social problems.



Figure 2.1 An urban village surrounded by high-rise buildings (top left); the main street of an urban village (top right); low-quality infrastructure (bottom left); high-density built environment (bottom right).

Like many of their counterparts in less developed countries, China's urban villages are typically sub-standard neighbourhoods, accommodating some of the most disadvantaged and discriminated members of the population. They share a number of characteristics with some informal settlement types found elsewhere. For instance, the growth of these settlements is often driven by rural-to-urban migration and the growth of the poor urban population (O'Hare and Barke, 2002; Mobrand, 2008), while urban expansion often leads to the proliferation of new unplanned settlements at the fringe of urban areas (Harris and Wahra, 2002; O'Hare and Barke, 2002).



Figure 2.2 Multifunctional development in urban villages: (a) dwellings with shops on the ground floor; (b) food market; (c) department store; (d) medical centre; (e) village office; (f) factory; (g) primary school; (h) ancestor temple.

However, while the prevalence of squatter developments has often been interpreted as a result of conflicts between government programmes and the demands of the people, or of the failure of public land and housing delivery systems (Turner, 1968; Harris and Wahra, 2002; Mobrand, 2008), the emergence and development of urban villages is, to some extent, a result of the compromise between the government and the people. When a city's government is incapable of facilitating the livelihood of landless peasants and the housing needs of rural migrants, they may then turn a blind eye to unauthorized development in urban villages, reflecting a type of *de facto* recognition of their importance as major enclaves for migrant labour. This labour is of course an advantage to the government in helping to continue to build the city and support the explosion of manufacturing that has been a major feature of China's recent urbanization.

The government needs the cooperation of the indigenous villagers in expropriating their agricultural land for urban development, but they rarely take care of the long-term livelihoods of the landless indigenous villagers. Consequently, although indigenous villagers develop extra housing units, industrial and service facilities in an unauthorized fashion, city authorities initially often ignore such activities. Later, however, when the land and building development becomes excessive, and if associated problems emerge that require government control, the momentum of such development may be so high that government interventions are next to impossible.

Consequently, many urban villages are heavily populated, overdeveloped with extreme plot densities and mixed land use, and lacking in both open space and infrastructure (Figure 2.1). Such features are also often found in Mumbai's slums, Rio de Janeiro's favelas, and other forms of informal settlements around the world. Also, like their counterparts elsewhere, they are generally viewed as problematic urban spaces. Official forces are often used to evict residents and enforce wholesale demolition programmes in the name of implementing urban development plans, the beautification of cities, 'cleaning up' criminals and eliminating other social problems (Mobrand, 2008; Watson, 2009). Moreover, the governments of Chinese cities consider many urban villages, especially those occupying land in prime locations, as an oppression of land value. As a result, many cities, such as Guangzhou, Shenzhen, Wuhan and Xi'an, have initialized citywide programmes to redevelop many urban villages into modern residential, commercial and office districts, while relocating displaced landlords into regular formal housing blocks.

2.3 Shenzhen

Shenzhen lies in Guangdong Province in South China (Figure 2.3: top left), located between longitude 113°46' to 114°37' and latitude 22°27' to 22°52'. The city is located in the south of the Pearl River Delta (PRD) (Figure 2.3: top right), one of the most developed and affluent regions of China; to the south it neighbours Hong Kong, the Special Administrative Region (SAR) returned to China in 1997. Shenzhen is a city with a moderately hilly terrain and its urban extent has spread in a linear fashion. The terrain of the city is undulating, particularly in the eastern region. The northwest of the city is relatively low lying, with sea plains along the west coast. It has a sub-tropical maritime climate, with an average annual temperature of 22.4°C (Ng, 2003).

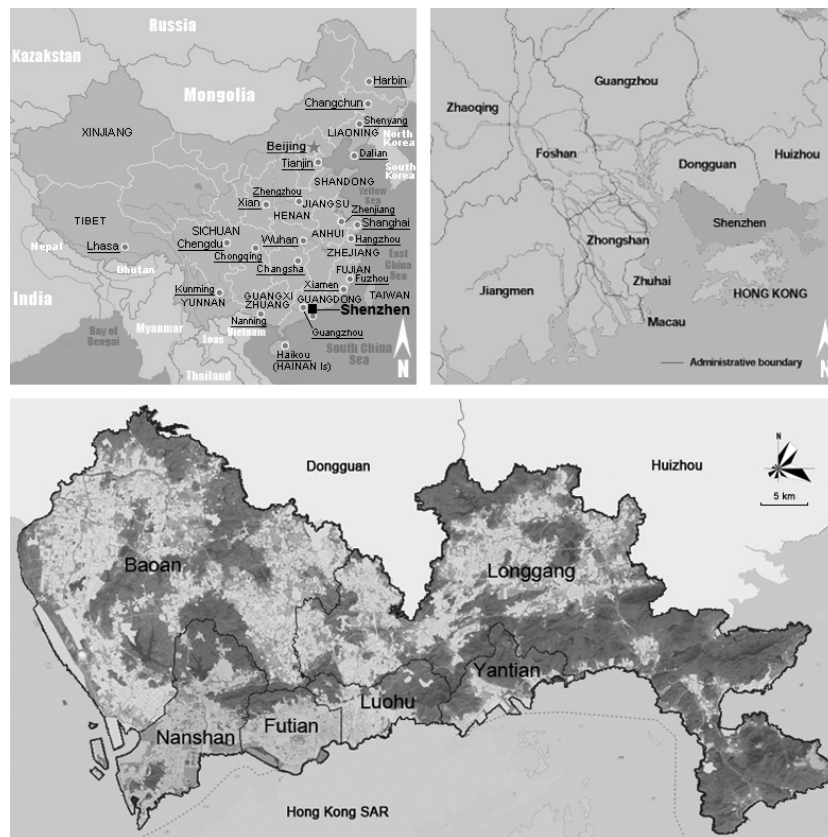


Figure 2.3 Shenzhen in China (top left), the Pearl River Delta region (top right) and Shenzhen Municipality (bottom) (Source: Shenzhen Municipal Government).

In 1980, Shenzhen was established as a Special Economic Zone (SEZ) with an area of 327.5 km², 40 km from east to west and 7 km from north to south. The Shenzhen SEZ has been used by the central government of China to experiment with a market economy and has had to deal with a range of uncertainties that were previously barely recognized or understood in China (Bruton et al., 2005). This has included the introduction and consolidation of a series of policy reforms and ‘opening-up’; the attraction of foreign capital and foreign companies; and the provision of infrastructure to accommodate incoming investment (Leaf, 1996; Ng, 2003). Shenzhen also initiated reforms in terms of its urban land, which marked the beginning of the private real estate developments in China since the establishment of the People’s Republic in 1949.

Benefiting from its strategic location and preferential political position, Shenzhen has been a flagship of the economic rise of China. It is also probably the fastest-growing city in the world. From 1979 to 2009, its population rose from about 310,000 to 14 million. Meanwhile, its urban land expanded from 20 km² in 1983 to 813 km² in 2009. The Shenzhen Municipality now has an administrative area of 1969 km², with six districts (Figure 2.3: bottom). Four of these—Luohu, Futian, Yantian and Nanshan—comprise the Shenzhen SEZ, which covers 410 km². The other two—Baoan and Longgang—were incorporated as districts into the Shenzhen Municipality in 1993. These are to the north of the SEZ, covering an area of 714 km² and 845 km², respectively.

2.4 Urban villages in Shenzhen

In Shenzhen, the dramatic expansion of urban space that has been sustained over three decades has contributed to the creation of 320 urban villages (Figure 2.4). In 2004, these covered 93.5 km², equivalent to 13.3% of the built-up land area and 50.3% of the residential land. They were composed of approximately 350,000 buildings, with a total floor area of 106 million m². Most of the urban villages were located outside the SEZ, covering 85.5 km² and accounting for more than 90% of the city’s urban village land. In the SEZ, urban villages covered only 8 km². However, as these urban villages are significantly denser, they provided about 20% of the total floor space of urban villages in the city.

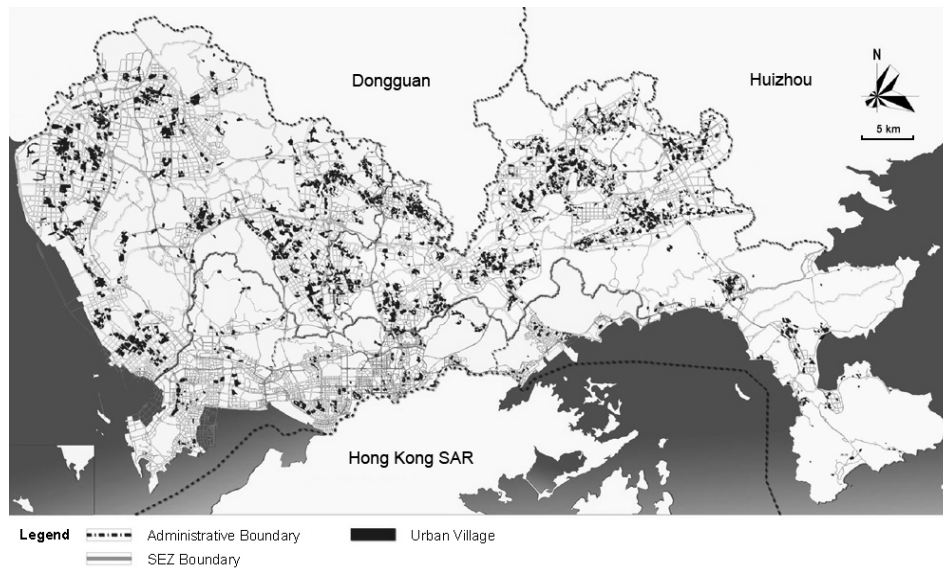


Figure 2.4 The distribution of urban villages in Shenzhen, 2005
(Source: Shenzhen Urban Planning Bureau).

Urban villages are distributed across the city, on both the outskirts and in the downtown segments. In the SEZ, urban villages are close to the city centre and district centres, where they are separated by newly developed urban space. These villages are therefore relatively distant from one another. The appearance of such urban villages, especially their extremely high built-up density, significantly distinguishes them from the formal areas of the city (Figure 2.1). Outside the SEZ, urban village developments are mostly located in district centres, sub-district centres and close to major transportation nodes, forming many clusters. Urban village buildings are often mixed with formal urban land uses, so that quite often their boundaries are rather blurred in comparison to those in the SEZ.

In 2004, the average floor area ratio and built-up density of urban villages in Shenzhen was 1.13 and 35% respectively, indicating that urban villages were much denser than the overall built-up area of the city. The construction intensities between the SEZ and the non-SEZ areas were significantly different (Table 2.1). With houses generally above six storeys, the average floor area ratio of urban villages in the SEZ was 2.7 and the average floor space of a single building was 506 m². However, with much lower buildings, the floor area ratio of urban villages outside the SEZ was only 1.0 and the average floor space was 275 m² (Urban Planning and Design Institute of Shenzhen, 2005b).

Table 2.1 Statistics of the physical characteristics of urban villages in Shenzhen, 2004 (Source: Shenzhen Urban Planning Bureau).

Districts	Number of villages	Land area (ha)	Plot area (10 ⁴ m ²)	Floor area (10 ⁴ m ²)	Number of buildings (10 ⁴)	Average storey	Built-up density (%)	Floor area ratio
SEZ	91	800	425	2139	4.2	5.0	53%	2.67
Luohu	35	236	125	648	1.2	5.2	53%	2.75
Futian	15	196	107	669	0.9	6.2	55%	3.42
Nanshan	29	291	157	721	1.7	4.6	54%	2.47
Yantian	12	78	35	101	0.4	2.9	45%	1.30
Non-SEZ	229	8549	2847	8423	30.7	3.0	33%	0.99
Baoan	138	4428	1476	4311	16.5	2.9	33%	0.97
Longgang	91	4121	1371	4112	14.1	3.0	33%	1.00
Total	320	9349	3272	10562	34.9	3.2	35%	1.13

Room renting is the main source of income for the indigenous villagers. Recent investigations in Futian revealed that family income is generally composed of four parts: profit sharing from the collectively-owned business (30%) (renting collectively-owned properties is the main source of income for collectively-owned businesses); house renting (60%); wages (4%); and family businesses (6%) (Urban Planning and Design Institute of Shenzhen, 2005b). These figures demonstrate that the livelihoods of the landless peasants have been transformed from agricultural production to property development and room renting.

2.5 Dynamic and diverse housing market

As a migrant city, the growth of the floating population of Shenzhen outweighs its permanent population. This is one of the most significant characteristics of Shenzhen. From 1979 to 2008, the annual growth rate of the floating population was 33.5%, significantly outpacing the growth rate of the population with local *hukou*, which was only 7.1%. Consequently, the proportion of the floating population in Shenzhen has been constantly increasing (Figure 2.5).

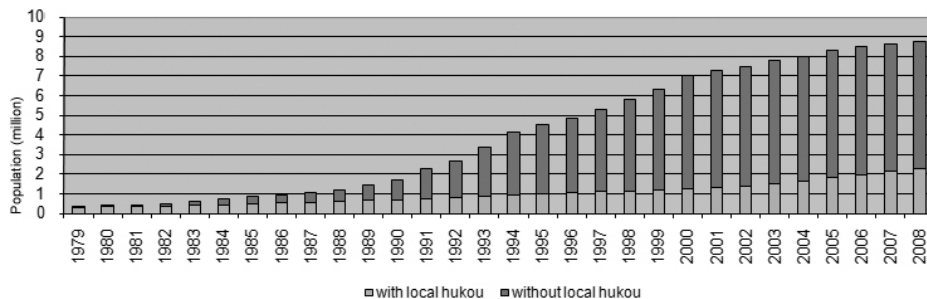


Figure 2.5 Population growth of Shenzhen during the period 1979–2008
(Source: Shenzhen Statistics Bureau).

In 2008, within the total population of 8.77 million, the floating population was 6.49 million, accounting for 74%. However, it is believed that these statistics excluded a large number of migrant workers who had not been officially recorded. The government estimates that the total population had already exceeded 14 million in 2007. If this is the case, the floating population could comprise as much as 84% of the total population. This group of people are unevenly distributed over the city, and many reside in urban villages. Outside the SEZ, where labour-intensive industries are mostly located, the rate of the floating population is higher than the rate in the SEZ.

A large proportion of migrants are accommodated in urban villages. According to a survey taken by the Public Security Bureau of Shenzhen in 2005, the floating population living in urban villages amounted to around 4.8 million, more than 13 times the number of indigenous villagers. Moreover, the increased size of the low-income population was closely linked to the construction of rental living space in urban villages. From 1999 to 2004, the total floor area provided by urban villages increased by 96%, from 54 million m² to 106 million m². The number of urban village buildings increased from about 240,000 to 349,000, and their land coverage expanded from 73 km² to 93 km².

The growth of urban village land mainly happened outside the SEZ (Figure 2.6). The increase in the quantity and the size of houses contributed to an increasing provision of cheap rooms in the housing market. In the late 1990s, the urban villages in the SEZ were already over-developed, with little remaining space for more buildings. Moreover, there were also many large-scale residential and commercial developments often associated with urban village redevelopment, which resulted in a decrease of land coverage by urban villages. Consequently, from 1999 to 2004 in the SEZ, urban village land increased by only 0.2 km², from 781 ha to 800 ha. In the SEZ, the number of urban village buildings

increased by 20%, from 35,290 to 42,300. The total floor area doubled, from 10.4 million m² to 21.4 million m². In the meantime, in the outer districts where land was more abundant, villagers were competing with urban expansion to occupy more land by constructing new houses. Land coverage by urban villages increased by 20.7 km², from 64.8 km² to 85.5 km². The number of urban village buildings increased by 50%, from 204,870 to 306,594, and their total floor space increased by 41 million m², which was 95% of the total floor space in 1999.

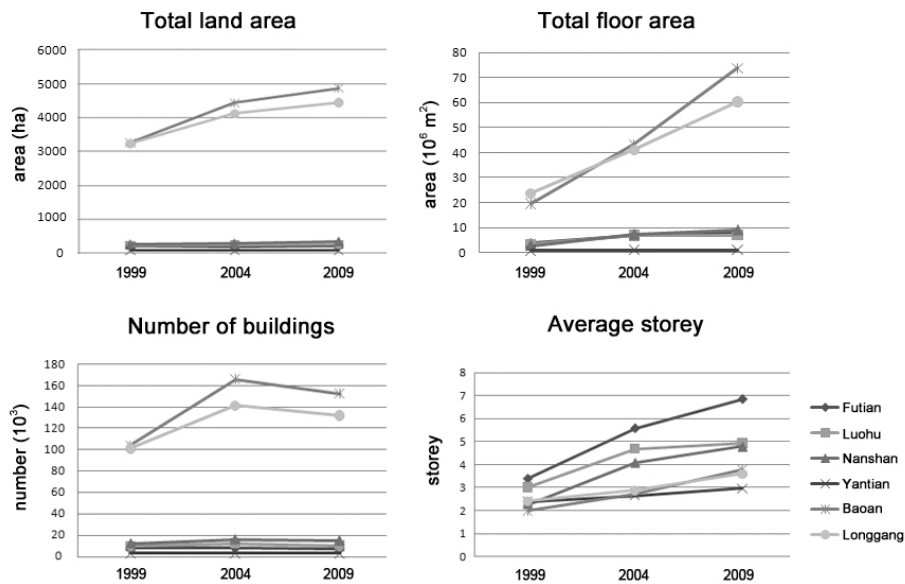


Figure 2.6 The development of urban villages in Shenzhen during the period 1999–2009.

From 2004 to 2009, land expansion slowed down and the number of buildings declined due to the regeneration of buildings by the indigenous villagers or government-led redevelopment. In general the growth of urban villages was sustained in terms of floor space and building heights. Such intensification of land use accommodated most of the population growth in this period.

In the six districts, urban villages are at different stages of development, just like the formal urban areas in which they are situated. This coincides with the different social characteristics between the districts. For instance, there are

fewer and smaller urban villages in the SEZ. However, many more tenants are accommodated in each urban village. In 2004, the average ratio of landlords to tenants ranged from 1:20 to 1:40 in the four districts of the SEZ. Outside the SEZ, the lower living density of each urban village led to a lower ratio of landlords to tenants of about 1:10 (Urban Planning and Design Institute of Shenzhen, 2005b). Although on average the landlords of urban villages inside and outside the SEZ possess similar areas of floor space, those in the SEZ usually gain more revenue, as the greater demand in the urban centre determines higher rents (Urban Planning and Design Institute of Shenzhen, 2005a).

In all six districts, urban villages serve as a lower-end product in the housing market. However, each district is distinguished from the others by its location and economic functions. Thus the different districts have different social structures (Table 2.2). In Futian and Nanshan, where most office buildings are situated, a large proportion of tenants are white-collar employees. In Luohu and Yantian, where the commercial sector and tourism are prominent, respectively, more than half of the tenants are employed in these sectors. In Baoan and Longgang, the majority of tenants in urban villages work in the industrial and service sectors. Furthermore, as Baoan accommodates a large amount of small businesses, a large proportion of tenants are the owners of these enterprises (Urban Planning and Design Institute of Shenzhen, 2005b). These patterns indicate that Shenzhen's urban villages function as a diverse housing market, similar to what is found in the formal housing market.

Table 2.2 Population structure of urban village residents; units: 10 thousands
(Source: Shenzhen Urban Planning Bureau).

District	Total residents	Ratio landlord:tenants	Landlord	Tenants				
				Total	White-collar	Business owner	Worker in industrial/service sectors	Others
Futian	59.1	1:30	1.9	57.2	26.8	5.7	17.2	7.4
Luohu	76.7	1:40	1.87	74.8	19.5	7.5	38.1	9.7
Nanshan	53.4	1:20	2.6	50.9	24.3	5.1	14.9	6.6
Yantian	15.3	1:30	0.5	14.8	2.4	1.5	9.0	1.9
Baoan	182.7	1:11	15.8	166.9	4.9	66.8	73.6	21.7
Longgang	124.1	1:8	13.3	110.8	3.2	10.0	83.2	14.4

2.6 Problems and government response

The governance of urban villages falls under the rural administrative system, and as such the design and construction of buildings are not constrained by the procedures that are applicable in the urban area. As indigenous villagers are maximizing their profits by constructing sub-standard housing units and extra floor space, many urban villages are overdeveloped, lacking sufficient infrastructure and heavily populated. Intensive use of space results in very narrow pathways and extremely narrow spaces between buildings. High living density often leads to service loads well beyond the capacity of the existing infrastructure. These characteristics are often deemed to be associated with a concentration of problems such as burglary, fire hazards, and health problems. The urban village is believed by some authors to present some of the worst features of shanty towns in other cities of the world (Zhang et al., 2003).

The picture of urban villages is therefore mixed. Although on the one hand they help alleviate the burden for the government to provide rooms for migrants and income for landless peasants, on the other hand the government tends to view these areas in a negative light, regarding them as a breeding ground for social problems, a scar on the city's scenery, and a factor contributing to the depression of land value. Such concerns lead to the government attempting to solve the 'urban village problem'.

In the 1980s, the government's solution was simply to clear the area and deport migrants from urban villages while maintaining indigenous villagers and their housing on site in new housing projects. The government considered this approach to be necessary; however, this approach has been criticized for being inhumane and even brutal (Zhang et al., 2003). Although such actions have sometimes caused conflicts, or even bloodshed, they could not forestall the flow of migrants into the cities. Soon after the deportations, migrants returned, and sometimes brought along their family and friends, making the urban villages even more densely populated.

In the booming real estate market since the 1990s, the clearance–deportation model was replaced by a demolition–redevelopment model (Figure 2.7). In this model, urban villages are designated as urban renewal districts, which will be gradually rehabilitated through a series of initiatives. This starts with administrative recognition, which nationalizes all collectively-owned land in urban villages, turning urban villages into urban administrative neighbourhoods and providing urban *hukou* status to indigenous villagers. Afterwards, the original urban village is demolished and reconstructed as formal real estate development. The existing housing is replaced by modern housing and commercial facilities according to market requirements and prevailing standards. Some of the apartments are allocated to the indigenous villagers as a form of

compensation, while others are sold at market prices. The government, if necessary, subsidizes the redevelopment by means of land price reduction, urban infrastructure facilitation and amenity provision.

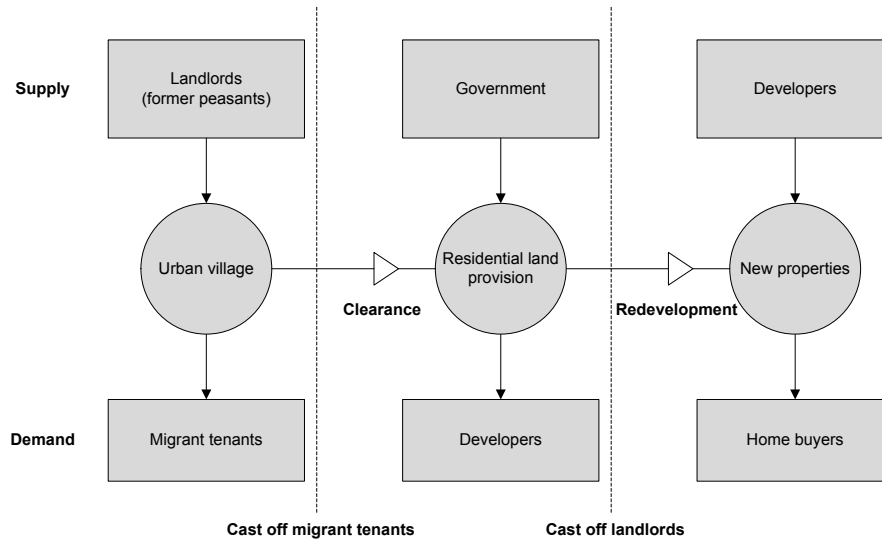


Figure 2.7 The demolition–redevelopment model.

The demolition–redevelopment process, implied by the name, comprises two moves: the clearance of old urban village houses (Figure 2.8, 2.9) and the redevelopment of new modern properties. By those two steps, the two groups that rely on urban villages for their livelihoods are cast off. In the clearance step, the migrant tenants are simply ignored, without any compensation or consideration. And in the redevelopment step, the land transactions realize the interests of the government and the developers. After a one-time compensation, the landlords’ long-term revenues are deprived, though they may be compensated with extra apartment units that allow them to continue their room rental businesses and generate income. However, they have lost their land use freedom and the possibility of creating more floor space.



Figure 2.8 The western section (Heyuan) of Gangxia urban village, Shenzhen CBD, 2009.



Figure 2.9 Demolition of the western section (Heyuan) of Gangxia urban village, Shenzhen CBD, 2011.

2.7 Policy and implications

In 2005, the municipal government of Shenzhen introduced its first master plan on urban village redevelopment: the Comprehensive Planning Guidelines for Urban Village Redevelopment 2005–2010 (Table 2.3). This plan listed four reasons to redevelop urban villages. First, as land scarcity becomes prominent, the land occupied by urban villages should be considered as potential land stock via redevelopment. Second, illegal constructions, chaotic land use and social problems such as crimes make urban villages become the most prominent, complicated and concentrated places of urban problems. Third, urban villages are perceived as suppressing the land value of their surrounding formal neighbourhoods and therefore they limit the progress of the city's improvement of urban structure and efficiency. Fourth, urban villages are to some extent outside the formal urban administration. Their house rental businesses jeopardize the environment of equal competition; and their land and housing market threatens the municipal control over, and revenues from, the land and property market.

Table 2.3 Urban village redevelopment scale 2005–2010; units: 10,000 m². No.1 refers to land area; nos. 2–6 refer to floor space (Source: Shenzhen Municipal Government).

Plan	Luohu	Futian	Nanshan	Yantian	Baoan	Longgang	Total
1. Land to be redeveloped	30	40	80	30	410	300	890
2. Buildings to be demolished	80	130	200	40	400	300	1150
3. Buildings to be rebuilt	145	190	365	110	1030	750	2590
4. Residence	100	125	310	90	920	670	2215
Type 5. Office	15	35	20	5	10	5	90
6. Commercial	30	30	35	15	100	75	285

The redevelopment plan stipulates that 8.9 million m² of urban village land, which is covered by a total 11.5 million m² of housing floor space, will be cleared during the period 2005–2010 to make room for new buildings with at least 25.9 million m² of floor area. When the urban villages are replaced by

formal housing and office units, the living density of these areas will significantly decline. Better-off residents will replace the former low-income tenants. In the SEZ, as commercial and business functions are promoted, a large proportion of the redeveloped space is designated for commercial use and offices. Consequently, housing stress in the SEZ will increase dramatically, especially for low-income migrant workers. As they choose to live in the SEZ mainly because of the proximity to their job locations—offices, restaurants, shops, etc.—redevelopment of their urban villages will force them to move away from their jobs and therefore increase their commuting time and costs.

To prioritize urban villages for redevelopment, the plan placed emphasis on certain zones, such as ecological zones, commercial and industrial centres, and areas that are near to existing or future metro lines. Accordingly, urban villages located in these zones are selected and prioritized. Subsequently, redevelopment proposals and site plans are prepared. Most redevelopment plans aim at improving the built-up environment and infrastructure through wholesale demolition and redevelopment; and, in the process of redevelopment, indigenous villagers are often compensated with new apartment units, which support their own housing and room-rental businesses. However, the original low-income migrant tenants of the urban villages are replaced by tenants and homeowners of much better economic status. The majority of the residents of urban villages will then be excluded from their former neighbourhoods. For the migrants, increased expenditure on housing and costs, as well as time spent commuting, will lead to tougher living circumstances, or possibly even exclusion from the city completely.

In many other Chinese cities, urban authorities have launched similar redevelopment programmes to demolish many urban villages and replace them with new mixed-use, commercial and housing neighbourhoods constructed by private real estate developers. Officials expect that such redevelopments will eliminate all problems bred in urban villages along with the deteriorated physical environment. However, new problems emerge: low-income groups face increasingly heavier housing stress; many existing social networks are broken; and the cheap labour force is driven away from jobs and the city. Such consequences are a reflection of a strong negative impact on the inclusiveness, social equity, and economic competitiveness of the cities.

2.8 Conclusions

The urban village, as a new urban form, emerged in Chinese cities only after the initiation of the 1978 economic reforms. It is a by-product of rapid urban expansion encroaching on rural areas. While the local government neglected the livelihoods and interests of the two most vulnerable groups—the indigenous

landless peasants and the rural migrant workers—urban villages have undeniably contributed to alleviating the problems of unemployment among the former, and the accommodation of the latter. Although unauthorized, urban village development reflects a locally appropriate response to observed demand for low-income housing and the entrepreneurial spirit of indigenous urban villagers in exploiting such economic opportunities.

This chapter has demonstrated how urban villages emerge and play a role in migrant housing. As the city grows, the increasing number of urban villages and their physical growth dramatically increase the city's overall capacity to provide housing and services, especially for low-income groups. However, the current policy, which aims at redeveloping many urban villages, is likely to disrupt the balance in the housing market. Moreover, without considering the diversity of the urban villages in terms of the variety of the housing provision, the redevelopment programmes targeting pre-selected urban villages will have an influence on certain groups of people, including many of the city's most vulnerable. There are risks to implement such programmes in both social and economic aspects. The potential housing shortage of the low-income migrants is likely to exclude many of them from the inner city and major development areas. As urban villages are increasingly marginalized in policymaking and planning, the social and economic influences of their upheaval could become an increasingly difficult challenge for the policymakers of Chinese cities.

Given the scale of urban village development in Shenzhen, a more viable solution in the current situation is to learn from the forms and implications of their growth and the relationship between urban village development and the overall urban development. Consequently, more realistic and responsive development strategies can be produced that reflect the evolution of urban villages and the resulting social and spatial diversity. These topics are discussed in more depth in the following chapters.

3

DEVELOPMENT AND REDEVELOPMENT OF URBAN VILLAGES

Hao, P., Sliuzas, R. and Geertman, S. (2011) The development and redevelopment of urban villages in Shenzhen. *Habitat International*, 35(2), pp. 214-224.

Abstract: China, like many other developing countries, has seen a huge influx of population into its cities coupled with urban expansion. The presence of massive numbers of rural migrants in cities does not result in slums or squatters due to institutional constraints. In the absence of government help, urban villages have evolved in many cities to provide adequate and affordable housing for the rural migrants. However, the urban villages are rejected by policymakers and face aggressive demolition–redevelopment programmes to replace them with formal urban neighbourhoods. This article explores different dimensions of the development and redevelopment of urban villages in Shenzhen. By linking to the development practice of the city, the physical and socioeconomic evolution of urban villages is found to be a result of the natural and logical response of the indigenous village population and the rural migrants in facing rapid economic development and social transition. Therefore, the demolition–redevelopment approach adopted by the government would be devastating not only for the rural migrants but also for the city’s economy which is largely based on labour-intensive sectors. Opportunities to explore alternative responses such as upgrading or the provision of village level development guidance do exist and could be explored.

3.1 Introduction

Many cities in developing countries are characterized by high rates of in-migration as well as poverty and social inequality. To house the increasing number of urban low-income households, it is almost impossible for governments in the developing world to provide or subsidize sufficient shelter. Consequently in fast-growing cities, the presence of low-income households

often contributes to the widespread proliferation of slum and squatter settlements.

In China, the economic reforms that began in 1978 have generated a significant and steady growth in investment, consumption and standards of living. While de-collectivization programmes released an enormous surplus of rural labourers due to improvements in agricultural productivity, cities have continued to attract labourers due to the growth in the industrial and service sectors (Fan, 2002). As such, rural-to-urban migration has created the largest labour flow unprecedented in the nation's history (Ma, 2004), resulting in the presence of about 70 million rural migrants working and living in urban areas at the end of 2000 (Song et al., 2008). As the *hukou* system (Wong et al., 2007; Duda and Li, 2008) of China has divided Chinese citizens into two unequal tiers—the privileged urban and the underprivileged rural—city authorities consider the rural migrants as temporary workers and officially refer to them as the 'floating population' (Bonnin, 2000; Goodkind and West, 2002). These 'floaters' are excluded from many urban amenities including medical care, education and housing (Fan, 2002; Zhu, 2007; Fu and Ren, 2010).

For the rural migrants, squatting is not a viable option to obtain shelter because, unlike the situation in many other countries, in China peri-urban land is inaccessible to migrants and authorities are intolerant of informal settlements (Wu, 2002; Wu, 2004b; Jiang, 2006). The massive and increasing housing demand of the migrants, however, is satisfied by so-called 'urban villages' in many cities (Song et al., 2008; Tian, 2008; Liu et al., 2010). The urban village is also known as villages-in-the-city or *chengzhongcun* in Chinese. During the process of urbanization, many rural villages have been spatially encompassed or annexed by the expanding city initially forming a distinctive rural landscape within the urban areas. The administrative status and land use of those villages often remain unchanged as the formal urban development simply leapfrogs the villages' settlement components. This kind of geo-social landscape has been created in many cities that have experienced a rapid pace of urbanization (Zhang, 2005).

The urban village phenomenon has aroused academic attention since the mid-1990s. Most early scholarly works viewed urban villages as a social place, which was characterized by social networks based on migrants' places of origin (Liu and Liang, 1997; Ma and Xiang, 1998; Zhang, 2001). Recent research is more focused on examining the emergence of urban villages and the role that urban villages play in housing migrants. Zhang et al. (2003) explained why urban villages are able to accommodate migrants in the absence of government help. Song et al. (2008), in their study on the demand side, proved that urban villages are a realistic and efficient urban housing market for the migrants. Tian (2008) found that property rights in urban villages are largely insecure, which

lead to many negative externalities including environmental and social problems. Liu et al. (2010) considered the urban village as a special form of neighbourhood, while Wang et al. (2009) argued that the development of urban villages is an important part of China's urbanization process. Most of these authors suggested that in the short run, the urban village is a realistic and effective solution in providing affordable housing for rural migrants, and thus the urban village deserves a moderate tolerance of its existing problems.

However, in view of the difficulty in accessing data, citywide studies about urban villages are scarce. Thus many important questions have not been answered such as: how did urban villages emerge and develop in the process of city development? To what extent do urban villages shape a city's socio-spatial space? And are there social and spatial diversities of urban villages in a city? The answers to these questions matter because these provide us with knowledge about the relations between city development and the creation and evolution of the urban village. Moreover, only at a city scale does it become possible to recognize and analyse the diversity of urban villages with respect to the overall pattern and structure of city development. Finally, in this way it will be possible to gain clues about how to deal with these urban villages in general and with specific ones in particular, not the least as input for planning and decision-making.

To start answering such questions, this article explores the development and redevelopment of urban villages in the extremely fast-growing city of Shenzhen. The data were collected during three fieldwork periods in 2006, 2008 and 2009. During the fieldwork 46 urban villages distributed over all six districts of the city were visited to observe interesting features of their development. Contextual and historical information was obtained through informal discussions with village residents, and leaders of 15 urban villages were interviewed to investigate the organization and development of their urban villages. Interviews were also held with officials of Shenzhen Urban Planning Bureau (SUPB) and the City-Level and District-Level Urban Village Redevelopment Offices⁴ to understand the government's perspective and approach in dealing with urban villages. Discussions and meetings were held with professionals of Urban Planning and Design Institute of Shenzhen (UPDIS) and Shenzhen Urban Planning and Research Centre (SUPRC) to examine the planning practice associated with urban village redevelopment. The first author also attended several regular meetings of professional and high-profile officials in which the planning and implementation of urban village redevelopment were

⁴ In Shenzhen at the city level, the City Office of Urban Renewal is responsible for the preparation of policies associated with urban village redevelopment. It also approves urban village redevelopment plans and supervises the implementation of the plans.

discussed. Policy documents pertaining to the redevelopment of urban villages in Shenzhen were also scrutinized. The paper is based on the cumulative findings extracted from these activities and is organized as follows.

The second section describes the underlying processes in the emergence and development of urban villages in Chinese cities in general. The third section presents the development of urban villages in Shenzhen in particular. The fourth section explains how urban villages transform their character in the process of the urban transition. The fifth section examines the redevelopment policy of urban villages and the progress of its implementation. The article concludes with the development characteristics and patterns of urban villages in Shenzhen and suggests implications based on the current policy.

3.2 Emergence and development of urban villages in China

For centuries, China was a predominantly agrarian village-based society. Even until the beginning of the socialist period in 1949, the urban population accounted for a mere 10%. After three decades of self-sufficient planned economy which restricted urbanization, the 1978 reforms launched on a journey of rapid urban transition. From then on, Chinese cities have not only become the country's engine of economic growth (Wu, 2007), but they have also facilitated urbanization by absorbing massive numbers of rural migrants. As China's urban economy has been developing at an average rate of 9.4% over the period 1978–2004, the urban built-up area has nearly tripled in two decades from 8842 km² in 1984 to 23,943 km² in 2004 (Ke et al., 2009). The urbanized proportion of the total population has leapt from 17.9% in 1978 to 45.7% in 2008 (National Bureau of Statistics of China, 2009) and is expected to reach 50% by 2020 (United Nations, 2004).

To accommodate investment and development, the government relies on urban development to convert peri-urban rural land for urban use. In this process, the government tends to requisition farmland rather than settlement components of the rural villages to avoid costly and time-consuming programmes requiring the compensation and relocation of indigenous villagers. Consequently, the settlement components of villages remain while their surrounding environment dramatically changes. Gradually such villages are spatially encompassed or annexed by new urban development, leading to the formation of urban villages. Urban villages first emerged in some cities of the coastal south such as Guangzhou and Shenzhen in the 1980s and then became prevalent in other coastal cities. Many inland cities such as Beijing, Xi'an, Kunming and Wuhan followed suit from the 1990s onward (Chan et al., 2003; Zhang, 2005; Liu et al., 2010).

The creation and prevalence of urban villages as a migrant housing market occurs in the presence of four conditions. First, indigenous residents of urban villages, on account of their rural *hukou*, have the legal right to cost-free land for their own housing. This right, which is unavailable to the urban residents and migrants, is the most valuable resource to finance housing construction (Zhang, 2005). Second, because the governance of urban villages lies outside the urban administration system, urban planning and development control regulations cannot be fully enforced, giving rise to loopholes. For example, home renovations, expansion and modifications for renting purposes proceed largely unimpeded (Tian, 2008). The ready supply of rental space helps to suppress the rent levels. Third, the restricted government jurisdiction in urban villages also results in a weak enforcement of room renting regulations, thus making housing in urban villages fully open to rural migrants (Zhang, 2005). Fourth, without a local *hukou*, rural migrants are excluded from either the more prestigious amenities or desirable jobs. They find low-paying jobs and therefore tend to live a marginalized and underclass life in the city (Fan, 2002). Consequently they are excluded from the formal housing market and are forced to seek accommodation in urban villages by virtue of their relative affordability and accessibility (Song et al., 2008).

In many cities, the urban village is now a major type of settlement for both local landless peasants and migrants, which are two groups with a high urban poverty incidence (Liu et al., 2010). The urban village not only provides low-rent housing for rural migrants, but also substantially increases the income of indigenous villagers who have lost their farmland and therefore their main source of livelihood. Exploitation of their housing is subsequently their most available means of income generation. In the absence of formal regulations and planning, the construction and maintenance of urban villages are on the basis of self-help. In order to maximize income, indigenous villagers have built high-density housing. Basic living standards are met through the provision of fundamental utilities such as water, electricity and sewage. However, due to insecure property rights of land and housing in urban villages, indigenous villagers tend to avoid long-term investments (Tian, 2008). They lack the motivation to improve the environment, maintain buildings, or upgrade the infrastructure. Moreover, urban villages are often associated with squalor, overcrowding and social problems such as crimes, fire hazards, public health, and conflicts. To diminish the environmental and social problems by transforming those urban villages into fully urban areas, official policies often aim foremost at demolition and redevelopment of these areas into large-scale modern living and service facilities. Consequently, urban villages can be absorbed within the formal administration system and the government can gain control over the new neighbourhoods.

While the spatial expansion of the city results in the emergence of the urban village, the development and structuring of the city then drive the evolution of the urban village. As the villages urbanize, their physical landscape, social structure and political system transform in response to market forces. Taken together, these different aspects constitute a dynamic matrix of forces that are not always fully synchronized. At the city scale, the uneven process of urban development drives the characteristics of different urban villages to diversify. As the number of urban villages grows and their role in urban housing strengthens, these in turn reshape the physical and social landscape of the city.

As an example, Shenzhen is a direct product of the reforms in China. It has grown in only 30 years to achieve an unprecedented level of migrants and economic productivity. In the 1980s and 90s, Shenzhen pioneered China's economic reforms and city development, and successfully established a strong economy based on export-oriented manufacturing industry. Entering the 21st century, the city's leadership has planned its transformation into a world city of business services and high-technology industries (Cartier, 2002). These development moves strongly influence the fate of its urban villages. The remainder of the article explores the development and redevelopment of urban villages with respect to the city development of Shenzhen.

3.3 Development of urban villages in Shenzhen

3.3.1 Shenzhen

Shenzhen, located in the Pearl River Delta in South China, is one of the most dynamic cities in China. In 1979 when Shenzhen was established, it was a sleepy border town with about 310,000 residents. Because of its proximity to Hong Kong, it was identified as an ideal site for developing an export-oriented economy. In 1980, the Shenzhen Special Economic Zone (SEZ) was established as an experiment to attract foreign capital, technology and management skills, making it the first city in socialist China to experience the operation of a market economy. It enabled Shenzhen to fulfil the task of managing a local economy instead of just following investment decisions from central ministries (Ng, 2003). Shenzhen has now developed to be a metropolis with 14 million inhabitants (Zacharias and Tang, 2010), far exceeding the official figure of 8.8 million in 2008 (SSB, 2009). The Shenzhen SEZ, comprising the four districts of Luohu, Futian, Yantian and Nanshan, occupies an area of 410 km². To the north of the SEZ are Baoan and Longgang districts with an area of 714 km² and 845 km² respectively (Figure 3.1).

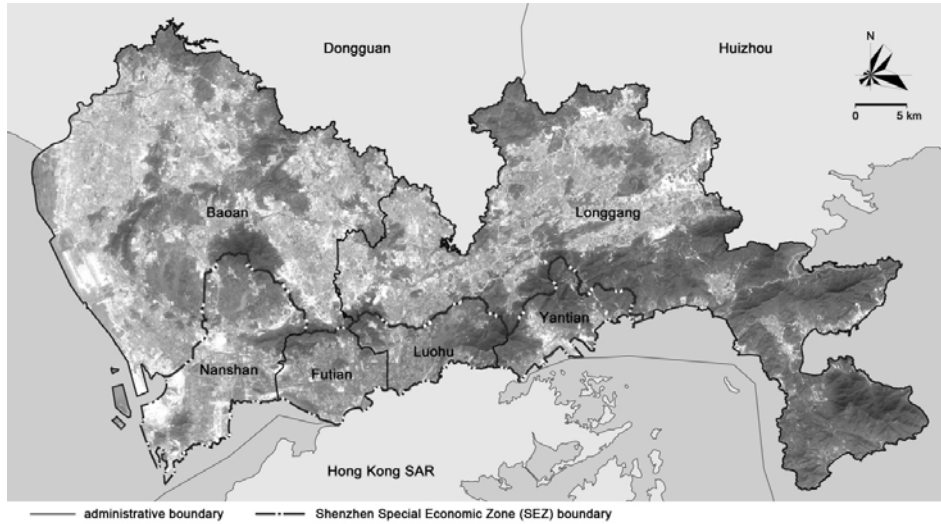


Figure 3.1 Landscape of Shenzhen and administrative divisions (Source: SUPB).

The experiment of the Shenzhen SEZ was successful judging by the growth in population size, spatial development and various economic parameters (Ng, 2003). For example, its GDP increased from RMB 200 million (US \$ 1 = RMB 1.55) in 1978 to RMB 780 billion (US \$ 1 = RMB 6.83) in 2008. Economic growth has driven a huge influx of migrant workers and urban spatial expansion (Figure 3.2). At the beginning in order to prevent migrants flooding into the SEZ, entrance into and exit from the SEZ was strictly controlled through border checkpoints. In 1993, the then rapidly industrializing Baoan County, outside the SEZ was integrated and turned into two administrative districts of the city in order to achieve proper planning and further the development of Shenzhen into a modern world city (Ng, 2003). In the mid-1990s, the border control was removed, giving migrant workers unrestricted access to the SEZ (Wang and Wu, 2010).

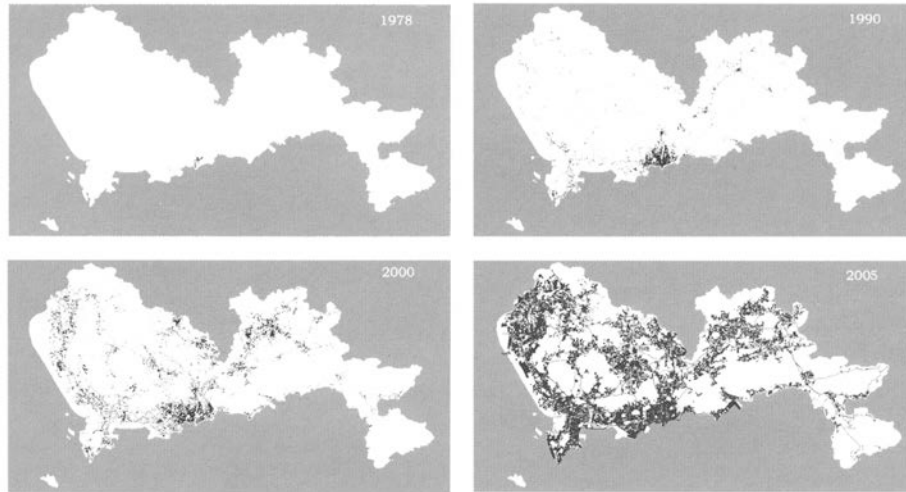


Figure 3.2 Growth of urban built-up area in Shenzhen 1978–2005 (Source: SUPB).

3.3.2 Emergence and development of urban villages in Shenzhen

The initial spatial development of Shenzhen occurred basically through encroaching on pre-existing rural areas. In 1979, Shenzhen's crop land covered 355 km², which was 18% of the total area (Shenzhen Urban Planning and Land Administration Bureau, 1998). Hundreds of thousands of peasants relied on the land to make a living. When urbanization and industrialization were launched, the growth of the city took place at the expense of great agricultural land loss. As a consequence, many of the peasants had to give up agricultural activities and seek other means of making a living.

In the 1980s, Shenzhen's development was based on engaging firstly domestic investors including many ministry-led or provincial enterprises and later on foreign investors (Ng, 2003). Preferential policies, cheap land and labour force attracted investors from inland Chinese cities, Hong Kong and other countries. However, in practice, the city government was initially confronted with limited financial resources to provide sufficient infrastructure and services. In this situation, when the government had to provide land for urban economic expansion (without much revenue), instead of expropriating all the rural land, only the fields were expropriated at a low price for new development and the village settlements remained as residential quarters.

Urban areas started to encroach on rural land in the initial development areas near to the Hong Kong border. Villages in those areas were gradually encircled by urban areas, following the classic model already discussed earlier to form urban villages. The proliferation of urban construction and industries absorbed migrant workers, which created an increasing demand for housing that the formal housing sector could not satisfy. Local villagers started to replace their traditional 1- or 2- storey dwellings with concrete houses of up to 4 storeys and rent extra rooms to migrant workers. In order to regulate construction in villages, the government passed a policy in 1982 to define and control illegal construction (Shenzhen Municipal Government, 1982). The maximum residential land area for each household was stipulated at 150 m², and the house footprint for each household should be no more than 80 m². Any construction that exceeded these limits was considered to be illegal. However, the compensation for the requisitioned farmland was at a standard of about RMB 50,000 per ha (about US \$ 25,000 per ha in the early 1980s)⁵. Furthermore, there was almost no consideration for the long-term livelihood of local landless peasants. In a situation where there was no enforcement in planning and construction, the response of the peasants—to construct rental housing—was both logical and necessary for their livelihood.

The built-up urban land expanded at the rate of 6 km² per year in the 1980s. While more urban villages were created, new construction projects and emerging industries attracted more and more migrant workers. Affordable well-located rental housing was in great demand. The urban villages responded to this demand and naturally became a magnet for migrants. Increasing numbers of migrant workers helped the peasants to draw a growing proportion of their income from rental properties. As the livelihood of the indigenous villagers and the housing problem of the migrants were simultaneously solved by the urban villages, the government turned a blind eye to the emerging urban village housing market and illegal construction occurring there⁶. The 3–4 storey houses soon became insufficient to meet demand and were replaced by even taller and bigger houses. However, compared to the formal urban areas, the building density of the urban villages then was generally low; courtyards and open spaces that were inherited from rural villages often remained.

In 1987, the national land reform, which was initiated in Shenzhen (Zhu, 1994), turned urban land use into a commodity that could be traded on the market. As

⁵ This is based on interviews with the leaders of neighbourhood committees and shareholding companies of Gangxia, Hubei and other urban villages in December 2008.

⁶ This is based on interviews with officials of Shenzhen Urban Planning Bureau in July 2009.

land prices rapidly rose, from the early 1990s, the real estate market in Shenzhen started to boom, driving the urban village market to develop further through even more intensive construction. The development of housing and industries outside the SEZ was also stimulated because there was less pressure on the land and labour market. However, rather than the planned developments in the SEZ, the nature of developments outside the SEZ was largely unplanned and associated with illegal land use and leasing (Hao et al., 2010). As urban development extensively spread northward beyond the SEZ border, new urban villages were rapidly created and those villages started to evolve physically and socially, ostensibly mirroring the development path of their counterparts in the SEZ.

Unbridled illegal construction, prevalent and ensuing social problems associated with urban villages made the government to be increasingly intolerant of the existence of such informal areas in the city. Although urban villages have aroused increasing public concern about their positive role in city development since the late 1990s, the government has viewed urban villages as an urban problem that has to be solved. Another policy was introduced in 1999 to control illegal construction (Shenzhen Municipal People's Congress, 1999), but it was largely ineffective. The total floor area of urban villages increased from 54 million m² in 1999 to 106 million m² in 2004 while the land area occupied by urban villages expanded from 73 km² to 94 km² (UPDIS, 2005b). The growth of urban village land had mainly occurred outside the SEZ, where the number of urban village houses increased from 204,870 to 306,594 (a 50% increase) in the same period, while the total floor space expanded by 41 million m² (a 95% increase) (UPDIS, 2005b). In the SEZ, where the spatial expansion of urban villages was hardly possible due to lacking vacant land, adding more storeys and extending plot areas were means used to create floor space. The number of urban village houses increased by 20% from 35,290 to 42,300, while the total floor area doubled, from 10.4 million m² to 21.4 million m² (UPDIS, 2005b). Consequently, buildings in urban villages in the SEZ were significantly taller and denser than their peripheral counterparts (Figure 3.3).



Figure 3.3 Gangxia urban village in Futian CBD in the Shenzhen SEZ.

Shenzhen has transformed from an agriculture-based rural society into an industrial-based modern city. Its agricultural sector, which made up 37% of its GDP in 1979, dropped to less than 0.1% in 2008 (SSB, 2009). This is largely caused by the encroachment of urban development on rural areas and the loss of farmland, which has contributed to the creation of 320 urban villages contained within the unit of administrative villages⁷ (Figure 3.4). In 2004, these urban villages covered 94 km² land, equivalent to 13% of the built-up land and 50% of the gross residential land. Approximately 350,000 houses were located in these villages, giving rise to a total floor area of 106 million m² (UPDIS, 2005b).

⁷ An administrative village (*xingzhengcun*), which is a bureaucratic entity, is different from a natural village (*zirancun*), which spontaneously and naturally exists. An administrative village can be composed of one or more natural villages. However, it also can be a part of a natural village when the natural village is very big.

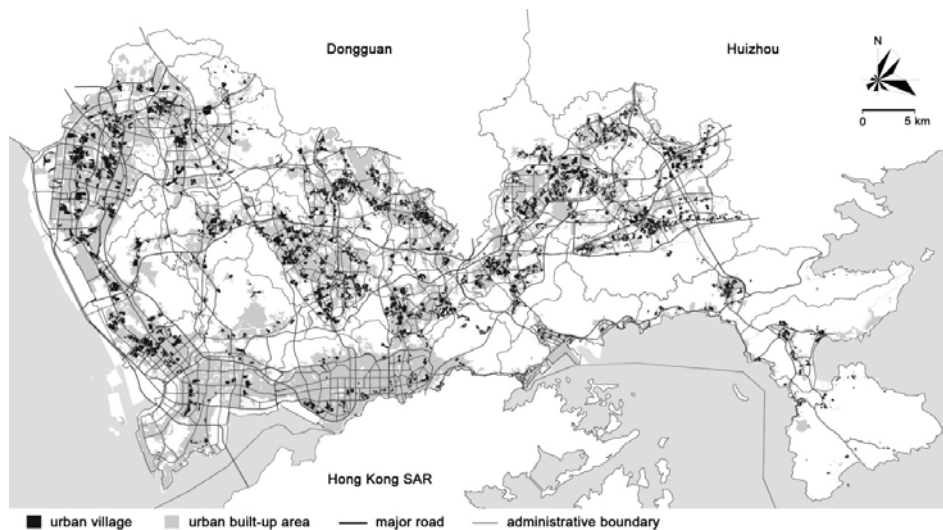


Figure 3.4 The distribution of urban villages in Shenzhen (Source: SUPB).

The development of urban villages has been propelled by the inflow of migrants. From 1979 to 2008, the annual growth rate of the floating population was 33.5%, much higher than the growth rate of the population with local *hukou*, which was 7.1% (SSB, 2009). Consequently, the proportion of the floating population in Shenzhen has been constantly and dramatically increasing. In 2005, the floating population that lived in urban villages was about 4.69 million, 14 times the number of indigenous villagers which was about 0.33 million (Shenzhen Public Security Bureau, 2005). These figures clearly demonstrate the importance of urban villages both as a source of affordable housing for migrants and as a source of livelihood for indigenous villagers.

3.3.3 Physical and social diversity of urban villages

As urban villages emerged since the birth of the city and prevailed as the city expanded, they are distributed over the city on both the outskirts and in the downtown segments. In the SEZ, urban villages are found close to the city centre and district centres, where they are separated by new urban space and they tend to be relatively distant from one another. The appearance of such urban villages, especially their extremely high built-up density, significantly distinguishes them from formal areas of the city. Outside the SEZ, urban village developments are particularly found in district centres, sub-district centres and near major transportation nodes, forming many clusters. The distribution of

urban village houses is often mixed with formal urban land use and their boundaries are more blurred in comparison to other villages in the SEZ.

The construction intensities between the urban villages in the SEZ and the non-SEZ areas are significantly different. With houses generally above 6 storeys, the average floor area ratio (total floor space / gross land area) of urban villages in the SEZ is 2.7 and the average floor space of a single house is 506 m². However, with much lower houses, the floor area ratio of urban villages outside the SEZ is 1.0, and the average floor space is 275 m². Outside the SEZ, urban village land covers 86 km², accounting for 91% of the city's urban village land. The remaining 9% of urban village land found in the SEZ covers only 8 km², but provides about 20% of the total floor space of urban villages in the city (UPDIS, 2005b).

Urban villages serve at the lower end of the housing market in Shenzhen. However, there is some variation across the different districts: urban villages are at varying development stages just like the urban areas in which they are situated. For example, as population density is higher in the SEZ, the ratio of landlords and tenants is about 1:30 in the SEZ, while outside the SEZ the ratio is about 1:10 (UPDIS, 2005a). Given that urban development is diverse in term of function and density, and different groups of the floating population are unevenly distributed in the city, the social structures of urban village residents vary in different districts. In the SEZ, there are significant proportions of urban village tenants who are white-collar employees and employees in the service sectors. Outside the SEZ, the majority of tenants in urban villages work in industrial and small business sectors (UPDIS, 2005b). Similar to the formal housing market, urban villages also function as a diverse housing market. The social status of the residents of an urban village may therefore reflect the types of jobs and activities available in the village's surroundings.

3.4 Characteristics of urban villages

The urban village has changed the simple rural–urban division of Chinese society (Wang et al., 2009) and functions as a transitional neighbourhood characterized by a mixture of rural and urban society (Liu et al., 2010). It thus plays an important role in smoothing China's transition from a rural society to an increasingly urbanized society. In order to understand how urban villages evolve to cater to the changes of their physical and socioeconomic context, urban villages are investigated using the five dimensions of 'becoming urban' as suggested by Friedmann (2005). These embrace administrative, physical, political, economic, and socio-cultural aspects. As urban villages are undergoing an urbanization process outside the official setting of urban

planning and development, their transformation has a distinctive character with respect to all five aspects.

3.4.1 Administrative status

In China, basic local divisions like urban neighbourhoods and village communities are administratively defined. Under the urban–rural dualism of land ownership, urban land is owned by the state while rural land is collectively owned by rural communities. Rural residents are identified by a rural *hukou* which confers on them certain entitlements such as free access to land. As a result, while urban land is tightly regulated in terms of planning and construction, rural land is autonomously managed, which leads to many loopholes in regulating land use, particularly in the rural–urban transition zones close to the cities. Under the urban land administration system, it would take months or even years to get approval for construction plans from the dozens of city authorities involved. But in urban villages, although these are located within the city boundary, the official rural status of peasants and the collective land ownership largely protects them from the intervention of urban planning control. Urban village collectives or villagers can obtain approval for construction relatively easily from township- or village-level authorities, or even start building houses without submitting any application. The city authority has been unable to prevent or halt such illegal constructions, because village leaders who are expected to practise the policies and regulations often have vested interests in the development process (Wang et al., 2009). Moreover, there was often no valid baseline survey on urban village houses, which the authorities can use to identify illegal construction. In this situation, whenever the city government tries to control illegal construction by introducing new policies, urban villages often responded with more intensive and extensive construction.⁸

3.4.2 Physical characteristics

In Shenzhen, most urban villages have an ‘urban look’ as streets are paved, and housing takes the form of multi-storey apartment buildings. In many urban villages there are also industries, shopping complexes, recreation facilities, hostels, medical clinics, and schools. The planning and construction of such facilities are organized at the unit of each individual village and are thus only relevant for the particular village. For an urban village, land use, road network and public facilities are organized with the purpose to facilitate the local

⁸ Statement is based on a meeting with officials of District-Level Urban Village Redevelopment Offices at SUPB on July 7, 2009.

residents' daily life and to maximize the collective and individual incomes of the indigenous villagers. However, as the village is adjacent to other villages or formal urban areas, land use is often chaotic and uncoordinated at a larger scale. For example, factories of an urban village that are purposely constructed away from the village's residential areas at the periphery could appear to be positioned next to dwellings of an adjacent neighbourhood. Besides, due to the absence of formal regulation and planning, urban villages often only provide infrastructures and a living environment at the minimum standard. Compared to the formal residential neighbourhoods, most urban villages are associated with relatively unsuitable land use, low-quality housing construction, severe infrastructural deficiencies, and a deteriorated urban environment.

3.4.3 Political system

In 1992 the Shenzhen SEZ government introduced a new political system (which was later also introduced to Baoan and Longgang Districts) replacing the village committee with a neighbourhood committee and a village holding company. Neighbourhood committees, the grass-root bodies of the city's political system, are now found in all urban neighbourhoods. The holding company usually has a comprehensive management structure comprising several departments to take care of collective property and business and sometimes also social and economic issues concerning daily life in the urban village⁹ (Figure 3.5). All indigenous villagers are shareholders of the holding company with the number of shares allocated according to their age and the number of years they had lived in the village. In most villages, shares were freely distributed. All the members of the executive board and the chief executive officer are elected from and by the shareholders. Membership of the neighbourhood committee is also generally restricted to indigenous villagers and migrants are rarely allowed to take up management functions or other important posts.

⁹ The following descriptive information is based on interviews with the leaders of neighbourhood committees and shareholding companies of several urban villages in July 2009.

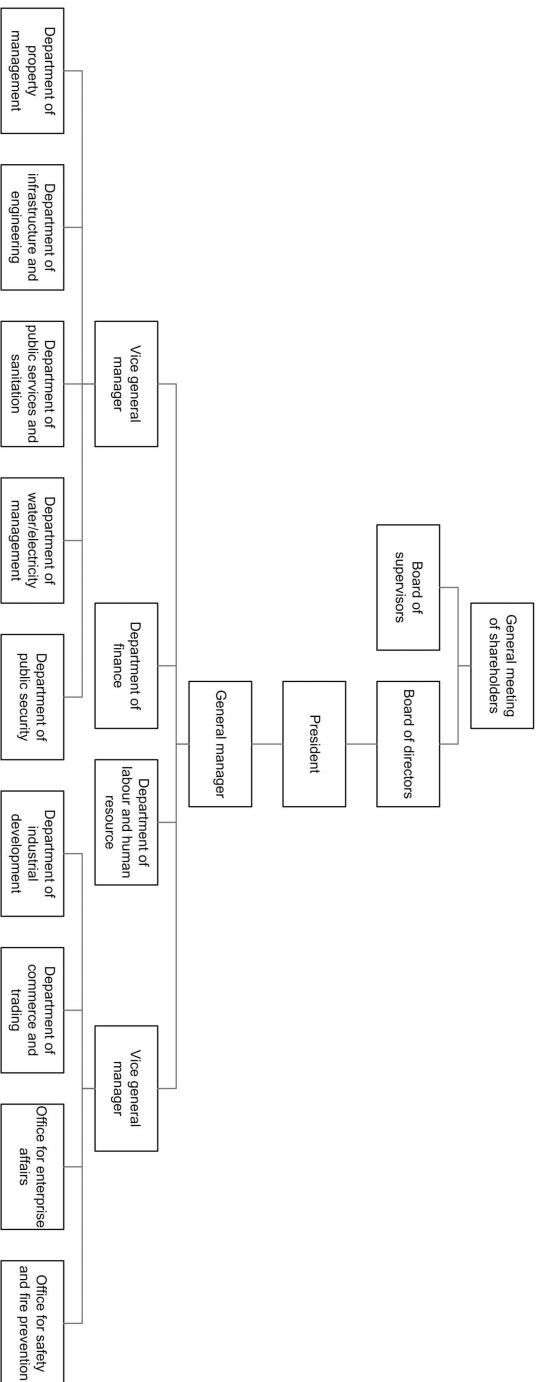


Figure 3.5 Management structure of the shareholding company of Gangxia urban village in Futian district.

Although this new political structure has incorporated the urban village into the urban management system, it is imbalanced as the neighbourhood committee is economically dependent upon the holding company. Through the activities of the holding company the indigenous villagers still rely on renting property to make profits, the urban village housing market was thus not much affected nor has the illegal development ceased. In many urban villages the holding company is responsible for social security, public security, public services, infrastructure investments, and financing of community activities. It also finances the operation of the neighbourhood committee and even pays the salary of the neighbourhood committee members. Neighbourhood committees, on the other hand, are entrusted with less economically important tasks such as birth control and household registration.

3.4.4 Economic activities

Economic activities basically involve four main actors: the village holding company, the indigenous villagers, the migrants and the business owners from outside the village network. The holding company is the organizer and manager of the collective's economic activities. It generates income from renting collectively-owned properties and sometimes also from local businesses such as a supermarket or factory. The main income source of indigenous villagers is room renting. In Futian district for example, on their average family income is composed of four parts: private room renting (60%), profit-sharing from the collectively-owned businesses and rental of collectively-owned space (30%), family business (6%) and wages (4%) (UPDIS, 2005a). The majority of migrants are employed by local businesses but a few may also rent space and operate a small business enterprise. Business owners from outside the village network rent space and operate larger-scale businesses such as factories, restaurants, hair salons and shops. Such businesses provide another source of job opportunities for the migrant tenants.

As the urban village economy is highly dependent on property renting, tenants are excluded from this activity.¹⁰ The shares of the holding companies are distributed only to indigenous villagers and these cannot be traded nor mortgaged. Third party investment into the holding companies and management responsibility are also restricted. Only in fields such as accountancy or engineering, which require specialized professionals, can outsiders be employed. The core of the urban village economy is therefore essentially a rather closed

¹⁰ The following examples are based on interviews with the leaders of neighbourhood committees and shareholding companies of several urban villages in July 2009.

property renting-based system and the production of rentable floor space is the prime means to increase both collective and private income and wealth.

3.4.5 Socio-cultural aspects

The social hierarchy of the urban village population comprises two polarized groups. While the indigenous villagers are the rich and privileged, the migrant tenants are mostly low-income and underclass workers. Migrant tenants generally do not participate in the activities and organizations of village communities. Except for collecting rents from tenants, indigenous villagers hardly have any contact with their tenants.¹¹ Although the income of the villagers is mostly generated by the tenants, many facilities and services provided by urban villages are only available to the indigenous villagers, for example recreational rooms and clubs for the aged. As for local traditional cultural events, which many urban villages have preserved, it is common practice that only indigenous villagers participate in those events.

Although indigenous villagers have become better off through room renting, on average about 95% of them still live in urban villages¹² despite the fact that standard residences outside their villages provide considerably better living environment and services. The advantages of abundant room space, drastically cheaper living costs, the local social network, the familiar environment in their villages and the necessity of managing their property renting business are overriding concerns for them.

3.5 Redevelopment of urban villages

3.5.1 The complexity of redevelopment

The redevelopment of urban villages is a complex process in which three main actors—the government, developers and landlords—compete for their own benefit (Figure 3.6). Officials perceive the urban village as more of an urban governance problem than a socioeconomic phenomenon. The undesirable appearance of urban villages, the social problems assumed to breed there, and the economic benefit offered by redevelopment, are the drivers behind the

¹¹ Based on interviews with indigenous villagers and tenants in urban villages in October 2006.

¹² Based on interviews with planners who participated in urban village surveys at UPDIS in October 2006.

government's endeavour to redevelop urban villages. The government sees initiatives for redevelopment as a means to bring such locations in line with comprehensive urban development planning via urban renewal projects, road extension, and the construction of large public facilities.

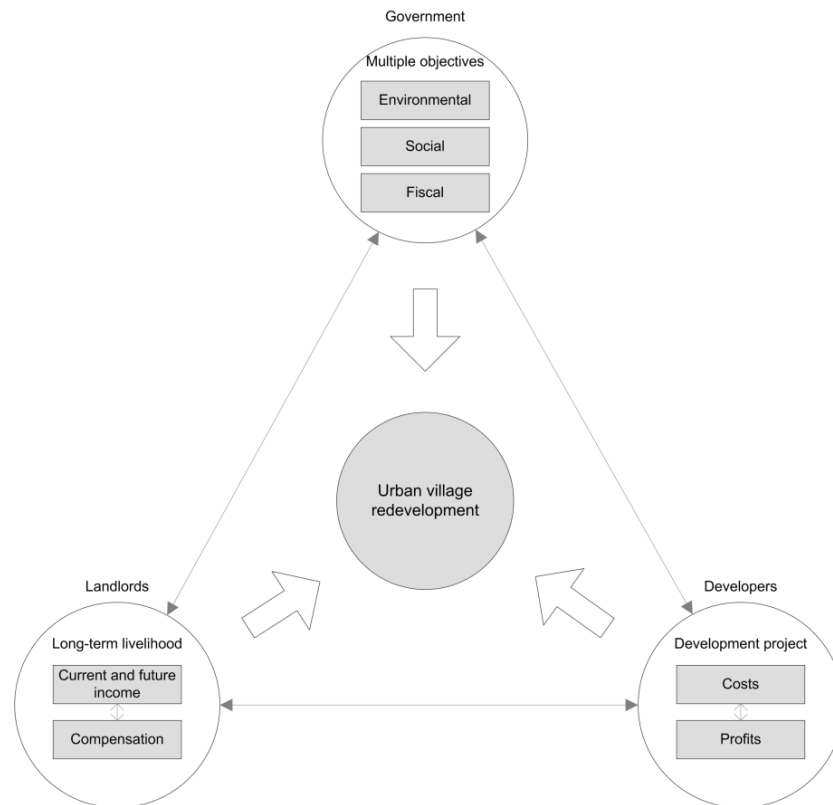


Figure 3.6 The interplay between the main actors in urban village redevelopment.

For developers, urban village redevelopment could mean substantial economic profits. Some urban villages occupy prime locations that are encompassed by commercial areas, modern residences, or industrial parks. These urban villages are close to jobs, transportation nodes and various public facilities, which provide good environment and services. The land and property of these urban villages are expected to command a much higher value. However, the informal status and poor quality of the urban village housing determines that they operate as a sub-standard, niche market for low-income housing, with extremely low rents compared to nearby formal housing. As the architectural style of houses

and the village layout may also account for a considerably lower floor area ratio than that obtainable with high-rise apartment buildings, urban villages are generally very attractive prospects for redevelopment.

For landlords, the housing demand generated by migrants has determined the development of housing. The rental prices vary according to certain features of different villages. The market prices reflect the accessibility of their locations, physical quality and services in exactly the same way as the formal housing markets. Landlords who own more profitable properties would be more unwilling to give them up. The land that they possess would definitely be more attractive for property development. Though the compensation would be considerable for landlords, they are hesitant to trade their property in view of the long-term revenue generated by their houses and the great potential of higher property value as a result of continual improvements in infrastructure and environment in the village's surroundings. Moreover, as developers must ensure that all affected landlords agree to redevelopment in order to realize redevelopment projects, redevelopment is difficult to initiate.

The complexity of the decision-making process is embodied in the different perspectives of the three main actors. Their individual decisions are based on the available information and are concerning purposes at different spatial scales. The government has multiple concerns on environmental, social and fiscal aspects, while the developers are driven primarily by economic interests and the landlords are concerned about the security of their long-term livelihood. Moreover, the lack of transparent information and efficient communication between the three actors creates a complex and difficult environment for reaching an agreement on redevelopment. For example, the compensation demanded by landlords influences the cost of the project; a new policy introduced by the government would affect the prospects of the landlords; and the negotiation between the developers and the government determines details of the redevelopment plan such as floor area ratio and the standard of amenity provision, which also directly impact on the project's profitability. These factors reveal a complex decision-making process that may or may not lead to the redevelopment of an urban village. In the process, the migrants, who form after all the largest group of residents in urban villages, are excluded from the decision-making.

3.5.2 Policy and implementation of redevelopment

Environmental and social problems associated with urban villages are regarded by the government as some of the most prominent, complicated and concentrated urban problems (SUPB, 2005). Besides, facing a shortage of land, the government considers urban villages as a great potential land stock for

future urban development. As it is foreseen that property prices will keep rising as the overall socioeconomic status of the city improves, redevelopment will become even more expensive. This concern reinforces the government's determination to redevelop the city's urban villages as soon as possible, especially those in the central locations.

On October 26, 2005, Shenzhen Municipal Government (2005) approved and introduced the Master Plan of Urban Village Redevelopment 2005–2010. The plan declared that 8.9 km² of urban village land, which is covered by houses accounting for 11.5 million m² of floor area, will be cleared in the period 2005–2010, to make way for at least 25.9 million m² of floor area offered by new buildings (SUPB, 2005). From 2005 to 2008, four annual development plans were introduced that clearly identified the annual redevelopment objectives and in total 137 redevelopment projects involved in either total or partial redevelopment of urban villages. These redevelopment projects were supposed to be carried out through a joint public and private effort. However, until July 2009, despite a tremendous effort to implement this redevelopment plan, only three redevelopment projects, with a total floor space of about 172,000 m², were completed. All of these were small-sized urban villages inside the SEZ. Other projects are in various phases of redevelopment including the preparation of detailed redevelopment plans, the examination of redevelopment plans by the authorities, the selection of developers, demolition and compensation, and the construction of new buildings. In general, the implementation of the redevelopment programme has been in a very slow pace and the progress significantly lags the planned schedule.

Still, the government persists in its endeavour to redevelop urban villages. If urban villages are replaced by formal neighbourhoods as planned, it is expected that better-off residents will replace the former low-income tenants. In the SEZ, as commercial and business functions are promoted, a large proportion of redeveloped space is designated for commercial use and offices. Consequently, housing stress in the SEZ will be more significant, especially for the low-income earners including college graduates and starters in the service sector. As their choice to live in the SEZ is mainly because of the proximity to their job locations, redevelopment basically means eviction and higher transport costs. If this is the case in the near future, the problems of accommodating migrants and balancing the trade-off between affordable housing and transportation will pose new challenges to the authorities.

3.6 Discussion and conclusions

The urban village, as a new urban form, emerged in Chinese cities only after the initiation of the 1978 economic reform. It is a by-product of rapid urban

expansion which encroaches on rural areas. While the local government neglected the livelihood and interests of the two most vulnerable groups—the landless peasants and the rural migrant workers—urban villages have undeniably contributed to alleviating the problems of the unemployment of the former and the accommodation of the latter. In this situation, the former group construct and maintain urban villages based on a self-help approach (Zhang et al., 2003), and the latter group concentrates in those urban villages based on their rational choice to seek affordable and accessible housing (Song et al., 2008) and minimal transport costs.

In Shenzhen, urban village housing accommodates most of the city's rural migrants. As a result, in the three decades of its rapid development, in the absence of public low-income housing provision, there is no sign of a shortage of labour. On the contrary, more and more migrants have come to the city, settled down, and contributed to the city's development and prosperity. The urban villages therefore alleviated the burden on the government to provide housing and jobs for the landless peasants and the risk of associated social unrest. The urban villages provide housing and services at a relatively low standard but at rents which are affordable to low-income households. Consequently, the low cost of living makes it possible to keep the wages of the employees of industrial and service sectors low, which has actually enhanced the competitiveness of Shenzhen as a major global manufacturing centre.

The emergence and development of urban villages in Shenzhen is tightly linked to the city's development, economic restructuring and social transition. As the city grows in terms of population size and built-up area, the increasing number of urban villages and their physical and socioeconomic evolution significantly increase the city's overall capacity to provide housing and services, especially for low-income groups. As the city goes through economic restructuring and social transition, resulting in diverse development themes and social restructuring at the city scale, urban villages also evolve differently in response to the specific housing demands of the local and migrant population.

The development of urban villages has in turn significantly shaped Shenzhen's urban landscape and the housing market on a citywide scale. As a major type of residential land use, the urban village is well integrated into the city's housing market as a more or less perfect substitute for standard commercial housing. The urban village not only broadens the range of housing choice, but also provides the opportunity for the migrants to use the urban village housing as a haven to settle down in the city and later, as a springboard, to seek better employment and accommodation.

Together with the perceived environmental and social problems associated with urban villages, the increasing shortage of land for future development faced by

Shenzhen drives the government to redevelop the urban villages. As the city still lacks a scheme for social housing provision, there are both social and economic risks associated with this policy. The potential shortage of cheap rental housing is likely to exclude many of the low-income earners in certain areas or even the city as a whole. Consequently the social inclusiveness of the city will be negatively impacted and the economic competitiveness of Shenzhen could also be weakened. Moreover, large-scale redevelopment could conceivably lead to large-scale intra-city migration of displaced tenants, promoting new development pressure in the outer districts and the decline of their environmental conditions.

In less than three decades, many urban villages have experienced a full life course of emergence, evolution and demolition. Despite the relatively short lives of some villages, their development is a profound historical process. However, as the urban village is increasingly marginalized in policymaking and planning, the social and economic impacts of the upheaval of urban villages could become increasingly difficult challenges for policymakers in China. Such issues can only be explored through longitudinal analyses which are the subject of ongoing research that will be reported subsequently.

Perhaps one of the major policy implications of the Shenzhen experience is the need to have a balanced, integrated perspective on urban development that also considers the two other pillars of sustainability, social equity and environment, as well as economic growth. In Shenzhen, as in many other Chinese cities, economic growth has been the main driving force for and of urban development. Given the emphasis that was initially placed on low-cost manufacturing as a basis for Shenzhen's creation, a clear, and supportive policy and programme for low-cost housing for employees from the city's manufacturing enterprises might have helped to avoid or alleviate some of the problems that the village redevelopment policy is now seeking to address. Migrant labour seems to be seen more as a means of production than as a social asset which contributes to the identity and culture of the city and for whom urban citizenship has a meaning that goes beyond employment and housing alone. The slow progress in implementing the current redevelopment programme indicates that there are considerable barriers to be overcome before this policy can be rolled out at the scale envisaged, and even then many more villages will remain unaffected. Looking at the different interests of the major stakeholder groups and the complexity of resolving the conflicts between them new strategies and responses may well be needed. Officials in Shenzhen and other Chinese cities in which urban villages form a substantial component of the low-income housing market would do well to consider whether and how intervention strategies could be broadened to include responses that would avoid mass demolition and relocation. Village upgrading or the adoption of a more pro-active response in those villages which are in the initial stages of their development, by providing

planning and design advice to the village committees and shareholding companies that might avoid over-development could be avenues worthy of further exploration.

SPATIAL ANALYSES OF THE URBAN VILLAGE DEVELOPMENT

Hao, P., Geertman, S., Hooimeijer, P. and Sliuzas, R. (2012) Spatial analyses of the urban village development process in Shenzhen, China. *International Journal of Urban and Regional Research*, DOI: 10.1111/j.1468-2427.2012.01109.x (in press).

Abstract: Urban villages are widespread in many Chinese cities, providing affordable and accessible housing for rural migrants. These urban villages develop rapidly over time to create more housing units and accommodate increasing numbers of residents. This article provides systematic analyses of urban village development in Shenzhen in the period 1999–2009. It reveals that the development of urban villages was driven by the overall planning and urban growth of the city, which resulted in significant variation in urban village development at the city scale. Three distinct but overlapping phases were observed: expansion, densification and intensification. The growth of urban villages was spatially clustered and changes over time in the distribution of growth centres suggest the possible diffusion of migrant employment out of the Special Economic Zone into two outer districts. In the recent urban regeneration process, the pattern and trend of urban village development is shown to contradict the city's urban village redevelopment programmes. This not only helps to explain the slow progress of the policy implementation, but also implies severe risks of jeopardizing the migrant housing market in certain urban sections.

4.1 Introduction

Urbanization is booming in the global South, and the rapid growth of urban populations often goes hand in hand with a housing crisis that local authorities are incapable of fully tackling. Consequently, squatter developments often dominate urban growth, reducing the planners' sphere of influence to the areas developed by public institutions and private developers (O'Hare et al., 1998;

Harris and Wahra, 2002; O'Hare and Barke, 2002). In China, one of the countries that has experienced rapid urbanization in recent decades, the types of informal urban settlements often found elsewhere do not prevail due to institutional constraints governing public access to urban land (Ho, 2001; Tian, 2008). This is, however, not to say that low-cost housing is not an issue. On the contrary, migrant enclaves in the form of so-called urban villages take shape in many cities and may even dominate the low-cost housing market. Understanding their development is therefore a pertinent topic for research.

China's urban village (or *chengzhongcun* in Chinese) differs from the urban planning and urban design concept of the 'urban village', which, in the context of western countries, refers to a village-style urban neighbourhood (Chung, 2010; Liu et al., 2010). China's urban villages are created by the land expropriation process for urban expansion, in which the farmland of peri-urban villages is requisitioned and used for new urban development, while the village's residential areas are retained by the indigenous villagers. This approach enables the government to avoid costly and time-consuming programmes to compensate and relocate affected indigenous villagers. The residual village residential areas are enclosed spatially by newly developed urban areas to form urban villages. At the same time, massive rural-to-urban migration creates an enormous demand for inexpensive and accessible housing units in urban areas, which is satisfied by additional housing units in urban villages built and rented out by their indigenous residents. This process therefore leads to the creation of a flourishing low-income housing market within urban villages without government assistance (Zhang et al., 2003; Tian, 2008; Wang et al., 2009).

The urban village phenomenon attracts researchers largely because, while urban villages are in essence a vital low-income housing market, their very existence is rejected by the authorities. In many cities, urban villages provide the only affordable and accessible form of housing for rural migrants who are otherwise shunned by the urban housing market (Zhang, 2005; Song et al., 2008). They also allow the now landless peasants to earn their livelihoods as landlords (Zhang et al., 2003), thereby transforming their socioeconomic characteristics, while satisfying the demand for low-income urban housing and services and simultaneously adopting new institutional structures required by the local authorities (Tian, 2008; Bach, 2010; Liu et al., 2010; Hao et al., 2011). Despite the important role of urban villages and their efforts towards formalization, the local government still maintains a negative view of them, claiming that they are associated with physical and social problems and that their existence suppresses the land value of their sites and neighbouring areas (Chen and Jim, 2010; Hao et al., 2011). Consequently, in many major cities, policies aim to solve the 'urban village problem' through their wholesale demolition and redevelopment into formal urban neighbourhoods. This approach has been criticized by many

researchers due to the potential social consequences, such as a housing crisis for the migrant population (Zhang, 2005; Song et al., 2008; Tian, 2008; Chung, 2009).

Most of the literature in this field points out the importance of urban villages in providing migrant housing and suggests that radical redevelopment policies are likely to do more harm than good to the cities concerned. However, many of these studies tend to view the urban village as a uniform phenomenon and discuss their pros and cons without differentiating between different urban villages across the city and the spatial differentiation of their development. Policymakers and planners tend to focus on the potential of urban village land for redevelopment purposes, rather than their past development processes or current status. Policymaking thus concentrates on selecting and prioritizing urban villages for redevelopment based on the government's planning prospects for the affected village lands, while the willingness of the local population to relinquish their property is overlooked. Consequently, local residents often resist the implementation of urban village redevelopment programmes, resulting in high costs to public resources. The lack of understanding about the development process of urban villages, its relations with planned urban development and the overall patterns of development in the city, undermines local government's ability to develop sound urban village policies.

This research reveals the development process of Shenzhen's urban villages during the period 1999–2009, based on intensive fieldwork in 2006, 2008 and 2009, and spatial analyses of data covering all of its 320 urban villages. Much of the data used were supplied by the Shenzhen Urban Planning Bureau (SUPB) and the Urban Planning and Design Institute of Shenzhen (UPDIS). The analysis begins by explaining how the overall approach to planning and development in Shenzhen has been driving the growth of its urban villages, resulting in their spatial variation at the city scale. Within this process, as the general policies aimed at curbing urban village development proved ineffective, the growth of urban villages was not constrained and their growth patterns and trends were shaped significantly by the city's expansion and restructuring. The implications of the recently introduced redevelopment programmes are also examined, providing insights into the slow progress of their implementation. Finally, the main findings and implications for local policymaking associated with urban villages are discussed.

4.2 The development of Shenzhen and its urban villages

Shenzhen is a new, experimental city established in 1979 as a part of China's open-door policy. The operation of a market economy in Shenzhen has enabled its astonishing economic development and population growth (Ng, 2003).

Consequently, spatial expansion of urban development has been swallowing its rural hinterland, leading to the creation of 320 urban villages (Figure 4.1). These urban villages are distributed throughout the city and exist as an interwoven component of the formal urban landscape and economy (Hao et al., 2011). They are thought to accommodate approximately seven million out of the city's 14 million inhabitants (Zacharias and Tang, 2010).

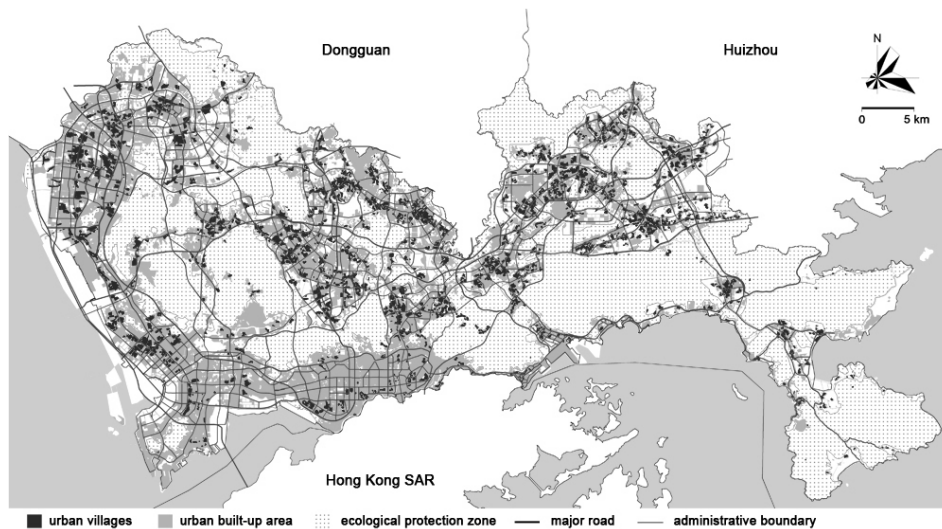


Figure 4.1 Urban villages in Shenzhen and the city landscape (Source: SUPB).

While the emergence of urban villages is a direct result of urban expansion, their transformation into migrant enclaves is an economic response to the demand for inexpensive housing from rural migrants (Zhang, 2005). Owing to China's *hukou* system (Fan, 2002; Wu, 2004b), rural migrants are considered temporary residents in urban areas, being officially referred to as the 'floating population' (Goodkind and West, 2002). Consequently, they do not have access to urban housing subsidies (Jiang, 2006; Zhu, 2007). These migrants, who are mostly young and single, are employed in labour-intensive sectors such as manufacturing, construction and consumer service sectors. For them, a room in an urban village, close to employment opportunities, may be all they can afford and the best they can get (Song et al., 2008). The arrival of large numbers of such migrants thus drives the development of urban villages.

4.2.1 Value capturing by the indigenous population

Like many of their counterparts in other contexts, Shenzhen's urban villages are typically sub-standard neighbourhoods, accommodating some of the most disadvantaged and discriminated members of the population. Their development characteristics share a number of similarities with some informal settlement types in other developing countries. For instance, the growth of these settlements is often driven by rural-to-urban migration and the growth of the poor urban population (O'Hare and Barke, 2002; Mobrand, 2008), while urban expansion often leads to the proliferation of new settlements at the fringe of urban areas (Harris and Wahra, 2002; O'Hare and Barke, 2002). However, while the prevalence of squatter developments has often been interpreted as a result of conflicts between government programmes and the demands of the people or of the failure of public land and housing delivery systems (Turner, 1968; Harris and Wahra, 2002; Mobrand, 2008), the emergence and development of urban villages is, to some extent, a result of the compromise between the government and the people. When a city's government is incapable of facilitating the livelihood of landless peasants and the housing needs of rural migrants, they turn a blind eye to unauthorized development in urban villages and the villages' emergence as major migrant enclaves.

The possibility for urban villages to provide a large quantity of inexpensive housing has its roots in China's dichotomous land ownership (Zhang et al., 2003). While the state owns urban land, the use rights of which can be leased in exchange for payment, rural land is allocated to rural communities free of charge (Tian, 2008). The collective ownership of village land does not allow villagers to alienate their lands, other than to transfer ownership to the government. However, the specific occupancy of a house plot turned each village family into a *de facto* landlord with unrestricted tenure (Zhang et al., 2003). As a result, the indigenous urban village residents can take advantage of their land's prime location and exploit it via highly profitable room rental to migrants. As development projects in urban villages are not scrutinized by urban planning or regulations, indigenous villagers are able to provide sub-standard housing and services. This not only substantially reduces the construction and management costs, thus enabling low rent, but also allows quick and massive constructions that provide large quantities of housing units to satisfy the increasing demand.

The government needs the cooperation of the indigenous villagers in expropriating their agricultural land for urban development, but they rarely take care of the long-term livelihoods of the landless indigenous villagers. Consequently, although indigenous villagers develop extra land and housing units in an unauthorized fashion, city authorities initially often ignore such activities. Later, however, when the land and housing development becomes

excessive and associated problems emerge that require government control, the momentum of such development may be so high that government interventions are next to impossible (Hao et al., 2010). Moreover, village leaders who are expected to adhere to the policies and regulations often have vested interests in the development process (Wang et al., 2009), so that the regulation of urban village development is often ineffective. As a result, indigenous villagers have been capturing value through building and renting housing units with little interruption or constraints. Given that the local government currently lacks financial instruments to levy development-related taxes, this lucrative value-capturing process has been exclusively benefitting the indigenous villagers.

4.2.2 Three phases of urban village development

The existence and distribution of urban villages are predetermined by their centuries-old presence as low-density residential settlements surrounded by farmland in the rural landscape. This provides the initial spatial settings for urban village development. These settings include their original size and layout, as well as their natural and man-made landscape. In the early stages of urban village development, encroachment on adjacent agricultural or idle land is relatively easy and more important within the constraints implied by financial considerations and technology. New houses are built on the vacant land around the village settlements, causing the village to expand. This encroachment becomes increasingly difficult over time though, as the expansion of both the village and the formal urban development convert the increasingly limited surrounding land. However, inside the village there may still be potential for more houses to be built, as the built-up density is still relatively low. Consequently, new houses are constructed within the village, yards are occupied by extensions and new houses, open spaces are developed, and roads are narrowed, all of which increase the villages' density. As developable land inside the village becomes scarce, continued pressure gives rise to upward expansion. By replacing traditional low-rise houses with concrete high-rise apartment buildings, the growth of floor space can be further sustained. Eventually, by maximizing the usage of available land and the height of buildings, possibly to their limits, an urban village can become extremely over-developed (Figure 4.2).



Figure 4.2 Gangxia urban village in the Futian CBD, Shenzhen.

The development path of urban villages thus involves three phases: expansion, densification and intensification. Facing increasing natural and institutional constraints, this development path is a logical response for the indigenous villagers to sustain the value-capturing purpose through exploiting the economic potential of their land. Given that urban development can be diverse (i.e. different places may experience different levels and types of urban development, population growth and infrastructure improvement), the room rental market in urban villages should therefore also vary according to the nature of development in their surroundings, as well as their location in the city, resulting in different speeds and scales of urban village development. For example, an urban village in a prime location is an attractive proposition to become a popular housing neighbourhood and thus is likely to experience greater development and become a front runner on the development path. By contrast, an urban village in a remote location is likely to experience much less development, lagging behind but following the same general development path. As a result, the overall growth of the city is a major driving force for urban village development, which is likely to reflect the variations in location, nature and speed of formal development in the environs.

4.2.3 Redevelopment: value capturing by multiple actors

Due to their association with over-development, sub-standard housing units and an unhealthy and unsafe living environment, urban villages are perceived as undesirable places by officials and formal urban citizens. The dissatisfaction expressed by formal urban citizens concerning urban villages generates strong political pressure on the city government, which is sensitive to the social consequences of urban disorder and a ‘bad image’ of the city (Zhang et al., 2003). Meanwhile, urban villages have benefitted constantly from the government’s investment in infrastructure and public facilities in the surrounding formal urban areas. As the indigenous villagers do not make any financial contribution to public finances, such as via property tax, the incremental land value has instead been fully captured by village committees and indigenous villagers through higher property rents.

For the government, converting urban villages into formal urban neighbourhoods is an effective way to improve the urban environment, and also to gain control administratively and economically over urban village land. Consequently, many cities have adopted a demolition–redevelopment approach to replacing urban villages with new formal neighbourhoods (Zhang et al., 2003; Tian, 2008; Chung, 2009). Redevelopment programmes introduced in different cities are largely based on their specific socioeconomic development goals and spatial planning prospects with emphasis given to major development areas for which a selection or prioritization of urban villages is made. In Shenzhen, an aggressive urban village redevelopment programme was introduced in 2005, called the Master Plan of Urban Village Redevelopment 2005–2010 (SUPB, 2005). This programme aimed to redevelop about 10% of urban villages by 2010 and, ultimately, achieve a ‘city without urban village’ through redevelopment in the longer term.¹³ Its implementation was supposed to be carried out through a combination of administrative and market forces.

In the market, the land and property of well located urban villages are expected to command a high value. As they currently operate as a sub-standard, niche market for low-income earners, commanding relatively lower rents compared to nearby formal housing, redevelopment offers good prospects for profit making through substantial increases in the floor area ratio (FAR) for high-rise apartment or office buildings (see Figure 4.2) and higher rents. Nevertheless, property developers are generally hesitant to take part in urban village redevelopment projects because the difficult preparation processes (negotiation

¹³ The Master Plan of Urban Village Redevelopment 2005–2010 was approved by the Shenzhen Municipal Government on October 26, 2005. (Shenzhen Municipal Government Document No. [2005] 127).

with local landlords, demolition, and compensation) can be very costly, time-consuming, and full of uncertainty. The government has the option of using incentives to attract developers, such as negotiable land lease fees¹⁴, infrastructure provision for the site, and even negotiable planning requirements for the new development¹⁵, all of which can enable a reasonable profit margin for the developers. However, these instruments reduce the profitability of redevelopment for the government.

The urban villages selected under a redevelopment programme are likely to face much stricter growth control. Through redevelopment, the urban village is converted into a formal urban development (e.g. apartment buildings, commercial facilities, office towers) and a new form of value capturing occurs. The government and the property developers are the joint beneficiaries of redevelopment, capturing and sharing the additional economic rent resulting from the formalization and upgrading of the neighbourhoods towards the middle- and high-income property markets. Indigenous villagers may benefit through a one-time compensation in the form of a lump sum of money or apartment units in the new buildings, but are often reluctant to accept these, preferring instead their land-use freedom, the production of housing units for rent, and the sustained revenue provided by house rental.

Moreover, when redevelopment programmes are introduced, it is also conceivable that the indigenous villagers of the selected urban villages would be motivated to continue constructing in order to claim more compensation. This leads to even more intensification and further increases the difficulty of redevelopment. In practice, the redevelopment is problematic and the demolition and redevelopment of urban villages may not be fully enforced, at least in the short term. Uncertainty and the lack of transparency and information sharing between the three parties—the indigenous villagers, the local government and the developers—are pronounced (Hao et al., 2011).

To summarize, the demand for low-cost housing leads to an increase of housing units in urban villages. Their development enables the indigenous villagers to benefit greatly from a value-capturing process that also depends upon investment in neighbouring formal urban areas. The development of an urban village is thus strongly related to its location in the urban fabric. However, the

¹⁴ Even though, in some cases, the land lease fee is determined through auction, the government may provide the developer with compensation for costs associated with the project preparation process.

¹⁵ The most common method is to increase the allowed floor area ratio, which enables more floor space to be built and therefore potentially higher profitability.

recent introduction of a government-led redevelopment programme changes everything as it initiates a new value-capturing process involving two more parties: the government and developers. This not only threatens to break the exclusiveness of the value-capturing process by the indigenous village population, but it also converts the collective village land to state-owned urban land, bringing to an end the land-use freedom of urban villagers. To gain more insights into the processes of urban village development and redevelopment, data gathered for urban villages in Shenzhen were analysed to examine whether the effects of such processes and factors can be observed empirically.

4.3 Methodology

The initial focus on the temporal and spatial changes of the urban villages was carried out via an analysis of three variables: gross land area (the land coverage of the urban village), built-up area (the sum of the areas of all building footprints) and total floor space (the sum of the floor areas of all buildings). These variables are linked to the three forms of growth discussed previously: expansion (more settled land), densification (greater built-up density through infilling), and intensification (increasing floor space per plot). In density terms, the latter two can be measured by built-up density (built-up area / gross land area) and floor area ratio (total floor space / built-up area), respectively. Consequently, the expansion, densification and intensification of the urban villages were examined quantitatively.

The study area was the whole city of Shenzhen, including the 410 km² Special Economic Zone (SEZ), comprising the four districts of Luohu, Futian, Yantian and Nanshan, and the much larger non-SEZ area comprising Baoan and Longgang districts, covering 714 and 845 km², respectively (Figure 4.3). Although urban village statistics for the period 1999–2009 were available at the level of the administrative village¹⁶ across the entire area, the relevant spatial boundaries were only available outside of the SEZ. In the non-SEZ districts, these boundaries are not only stable over time, but they are also used for urban village surveys and redevelopment planning. They therefore provided a standard to integrate data and allow the effects of the redevelopment programme to be assessed. Within the SEZ area, as a result of intensive urban development, the administrative village boundaries are no longer used. Instead, the *jiedao*, an administrative division similar to a ward in western cities, is used for the SEZ

¹⁶ An administrative village (*xingzhengcun*), which is a bureaucratic entity, is different from a natural village (*zirancun*), which spontaneously and naturally exists. An administrative village can be composed of one or more natural villages. However, it also can be a part of a natural village when the natural village is very big.

districts. The *jiedao* boundary is basically an aggregation of former administrative village areas, so the statistics for the 91 administrative urban villages inside the SEZ districts were aggregated to 30 *jiedao* areas prior to the analyses being made. The final result was that the city could be divided into 261 analysis units: 30 *jiedao* in the SEZ, and 231 administrative villages outside the SEZ. The city's 320 urban villages were found in 255 of the 261 analysis units.

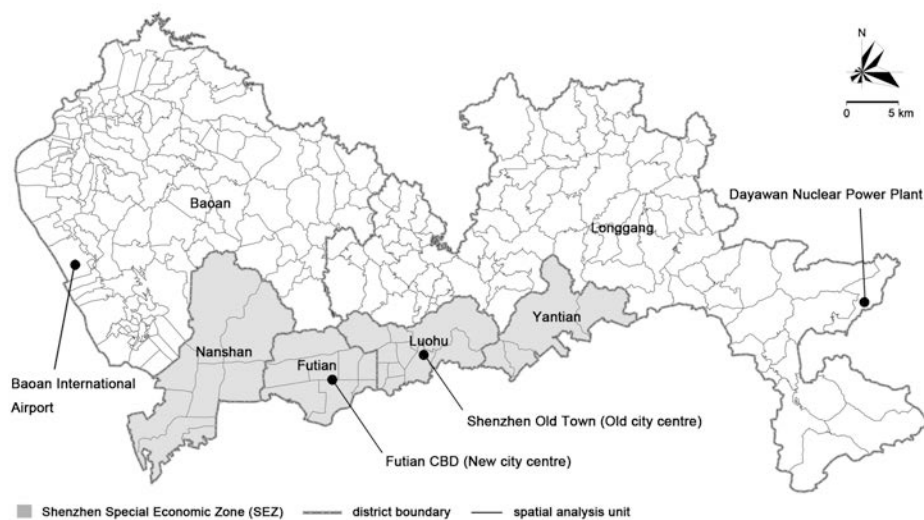


Figure 4.3 Administrative division and analysis unit.

At the level of the administrative village, the UPDIS collected data about the physical status of all urban villages in Shenzhen in 1999, and then again in 2004. These data include gross land area, number of buildings, total built-up area and total floor space. A more detailed survey was commissioned by the SUPB in 2009, which provides data for every building in the urban villages, including their plot area, house footprint area, the number of storeys and floor space. These were aggregated at the administrative village level for comparison with the UPDIS data of 1999 and 2004.

The physical status of urban villages in 1999, 2004 and 2009 and the changes in the periods 1999–2004 and 2004–2009 were examined. Comparisons between different districts and the two time periods were made to reveal the variation in urban village development among districts and their development trends over time. To evaluate the changing phases of urban village development, we used

dependent *t*-tests to examine whether the urban villages experienced different development in the two periods in terms of expansion, densification and intensification. Their development rates in the two periods were mapped to examine the spatial and temporal development patterns. To assess the effects of the redevelopment programme implemented in 2005, the urban villages involved in redevelopment projects were first identified, and then independent *t*-tests were used to examine whether the targeted urban villages had experienced developments that were significantly different from those of non-targeted urban villages.

As the growth of urban villages is driven by the housing demand of migrants, the growth pattern of urban villages, which implies the distribution of migrant population growth, is of great importance for policymaking. Specifically, it is necessary to understand where and to what extent the growth is concentrated. For this purpose, spatial autocorrelation analysis was used to examine if the urban village development is spatially concentrated and to identify the development clusters independent from classification schemes typically used in choropleth mapping.

Global Moran's *I* analysis was applied to detect the presence and degree of spatial clustering of urban village development at the city scale. This method tests if urban villages that share similarities in their geographic location have experienced similar development. We used the contiguity weight to express the spatial weight matrix and used 999 permutations to test the significance of the global Moran's *I* against a null hypothesis of spatial randomness. A positive Moran's *I* means that adjacent urban villages have similar values and show more or less identical development (i.e. the increase/decrease of land area, built-up area or total floor space), and thus the occurrence of spatial clustering, while a negative Moran's *I* means that development tends to be spatially dispersed.

Local Moran's *I* analysis was applied to identify local clusters reflecting either positive or negative spatial autocorrelation. At the local level, spatial autocorrelation was measured using the Local Indicators of Spatial Association (LISA), developed by Anselin (1995). We used the contiguity weight to calculate LISA, as was done with the global Moran's *I*. LISA statistics allow for the decomposition of the pattern of spatial association into four categories (the sum of all the local Moran's indices is equal to the global Moran's index), corresponding with four quadrants in the Moran scatterplot (Figure 4.6). The horizontal axis is expressed in standard deviation units for the urban village development. The vertical axis represents the standardized spatial weighted average of the neighbours for the urban village development. Two of these categories imply positive spatial association; namely, when an above-average value in a location is surrounded by neighbours whose values are above-average (high-high, top right quadrant), or when a below-average value is surrounded by

neighbours with below-average values (low-low, bottom left quadrant). In contrast, negative spatial association is implied when a high (above-average) value is surrounded by low (below-average) neighbours, and vice versa (high-low in bottom right quadrant and low-high in top left quadrant). The slope of the linear regression line through the scatterplot is the Moran's *I* coefficient. The significance level was set at 5% and 999 permutations were used to identify spatial units with significant spatial autocorrelation. Based on the category of significant spatial units, LISA cluster maps were produced, indicating the distribution of the development clusters of the four categories. The high-high units represent concentrations of high urban village development, while the low-low units represent concentrations of low urban village development, or perhaps even declines in development. The high-low and low-high units represent the places where urban villages experienced development significantly different from their neighbouring urban villages.

4.4 Patterns and trends of urban village development

Since its inception Shenzhen's growth has been staggering. Its growth outpaced every major city in China throughout the 1980s and 1990s and surpassed its own planned levels several times (Zacharias and Tang, 2010). In 1999, Shenzhen's official population was 4.05 million, projected to grow to 4.2 million in 2005 and 4.3 million in 2010. In fact, the total population including the official population and migrants is believed to have already been above 14 million in 2007. Numerous migrant workers were attracted by the booming industrial sector, most of which is characterized by unplanned development (Hao et al., 2010). With the growth of the migrant population, the related increased demand for low-income housing has been satisfied by urban villages (Hao et al., 2009). From 1999 to 2009, urban villages in Shenzhen experienced significant growth, indicated by the increase of gross land area, total built-up area, and total floor space of urban villages (Table 4.1). The standard deviations of the variables changed proportionally to the changes of the variables.

The data also show that growth was not uniform over the entire period. The built-up density of urban villages rose in the 1999–2004 period, but declined slightly in the 2004–2009 period. Meanwhile, the average floor area ratio of urban villages rose quite steadily from 2.24 in 1999 to 3.02 in 2004, and to 4.23 in 2009. The total floor space grew throughout 1999–2009, contributing to an increase of floor space of 105 million m². By contrast, the total floor space of commodity houses completed in this period was only 58 million m² (Shenzhen Statistics Bureau, 2010), which clearly indicates the contribution made by urban villages to Shenzhen's housing market.

Table 4.1 Statistics of physical status of urban villages per analysis unit in 1999, 2004 and 2009 (N = 255).

Variable	1999		2004		2009	
	Mean	SD	Mean	SD	Mean	SD
Gross land area (ha)	28.6	26.7	36.7	33.0	39.8	36.7
Built-up area (ha)	8.5	8.4	12.9	11.7	14.0	12.7
Total floor space (10^4 m ²)	21.1	26.6	41.6	48.0	62.3	65.7
Built-up density (%)	31.5	11.0	37.1	11.4	37.0	9.4
Floor area ratio	2.24	0.73	3.02	1.18	4.23	1.24

The development of urban villages resulted in varying density distribution patterns (Figure 4.4). In 1999, the built-up density was already high in the villages within the SEZ, further increasing in the villages in the new centre (Futian) and the villages close to this new centre during the period 1999–2004, and stabilizing at a high level in the period 2004–2009. The floor area ratio in all villages in the SEZ increased during the whole period, including the period after 2004, reflecting clearly the process of intensification. Outside the SEZ, built-up densities were low in 1999, but rose quickly in 1999–2004, and rose further still in 2004–2009. The spatial pattern shows a spillover effect from Nanshan (west of the new centre, Futian) and from Luohu (the old centre). After 2004, villages at an even greater distance from the SEZ started to densify and intensify.

In each year studied, urban villages in the SEZ generally had a higher built-up density and FAR than those in Baoan and Longgang, though there is also evidence of the emergence of greater levels of development in the northwestern villages close to the neighbouring, highly developed city of Dongguan. The highest built-up density and FAR were found in some urban villages in Futian and Luohu, while those in remote places, or near development-restricted areas such as ecological protection zones (see Figure 4.1), and the areas close to the nuclear power plant (see Figure 4.3), had the lowest built-up density and FAR. From 2004 to 2009, some urban villages experienced a decrease in built-up density. In a few cases this was attributable to redevelopment, but more often to land expansion and regeneration of buildings by the indigenous villagers themselves. However, for most areas, the FAR continued to rise throughout the period 1999–2009. Although the absolute growth of built-up area of urban villages is more pronounced in Baoan and Longgang districts, owing to their larger number (see Figure 4.1), their development phase generally lags behind that of villages in the SEZ districts.

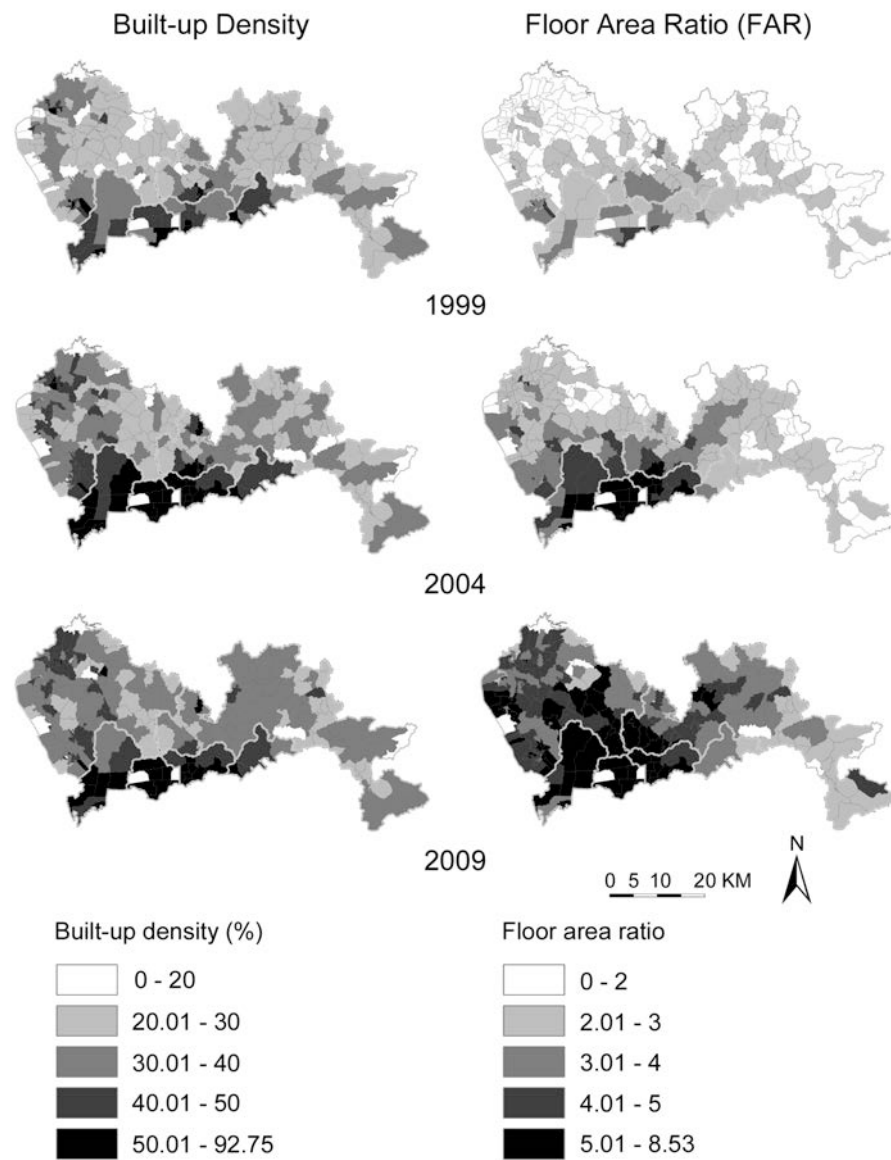


Figure 4.4 Built-up density and floor area ratio of urban villages in 1999, 2004 and 2009.

4.4.1 Development phases

Comparisons were made between urban village developments in the two periods, the results of which are shown in Table 4.2. On average, the urban villages experienced less expansion ($t = -7.2$, significant at the 0.1% level) and less densification ($t = -10.2$, significant at the 0.1% level) in the second period than in the first period. The average land expansion substantially reduced in the second period from 8.2 ha to 3.0 ha. The change in built-up density also dropped significantly from a 5.6 percentage points increase in the first period to a 0.1 percentage point decrease in the second period. However, the intensification of the urban villages in the second period was greater than that in the first period ($t = 6.3$, significant at the 0.1% level).

Table 4.2 Comparison of the growth of urban villages, 1999–2004 and 2004–2009.

Statistics	Variable tested		
	Expansion (ha)	Densification (%)	Intensification
t	-7.170	-10.165	6.311
df	254	254	254
P (2-tailed)	0.000	0.000	0.000
Mean (04–09)	3.0	-0.1	1.2
Mean (99–04)	8.2	5.6	0.8

As land availability around and within urban villages diminished over time, the expansion and densification of urban villages decelerated significantly as it was increasingly difficult to construct buildings in the already densely-built areas. The 2005 redevelopment programme might also have had an effect on curbing land development in urban villages. However, the intensification of urban villages was sustained, showing no sign of slowing down. Despite the natural and institutional constraints on expansion and densification, there was still great potential to increase total floor space by increasing the height of houses. The overall growth phase of urban villages in Shenzhen has been shifting from expansion and densification to intensification, and it was this intensification that sustained the provision of urban village housing throughout the most recent decade.

The rates of expansion, densification and intensification are shown in Figure 4.5. In the first period, the expansion rates of urban villages outside the SEZ exceeded those within the SEZ, while their densification rates were more or less

identical. The intensification rates of the SEZ's urban villages significantly exceeded those of villages outside the SEZ. Since the late 1980s, the land development in the then Baoan County, outside the SEZ, was enormous. When it was incorporated into Shenzhen to form Baoan and Longgang districts in 1993, development continued and a large proportion of those developments were unplanned and illegal.

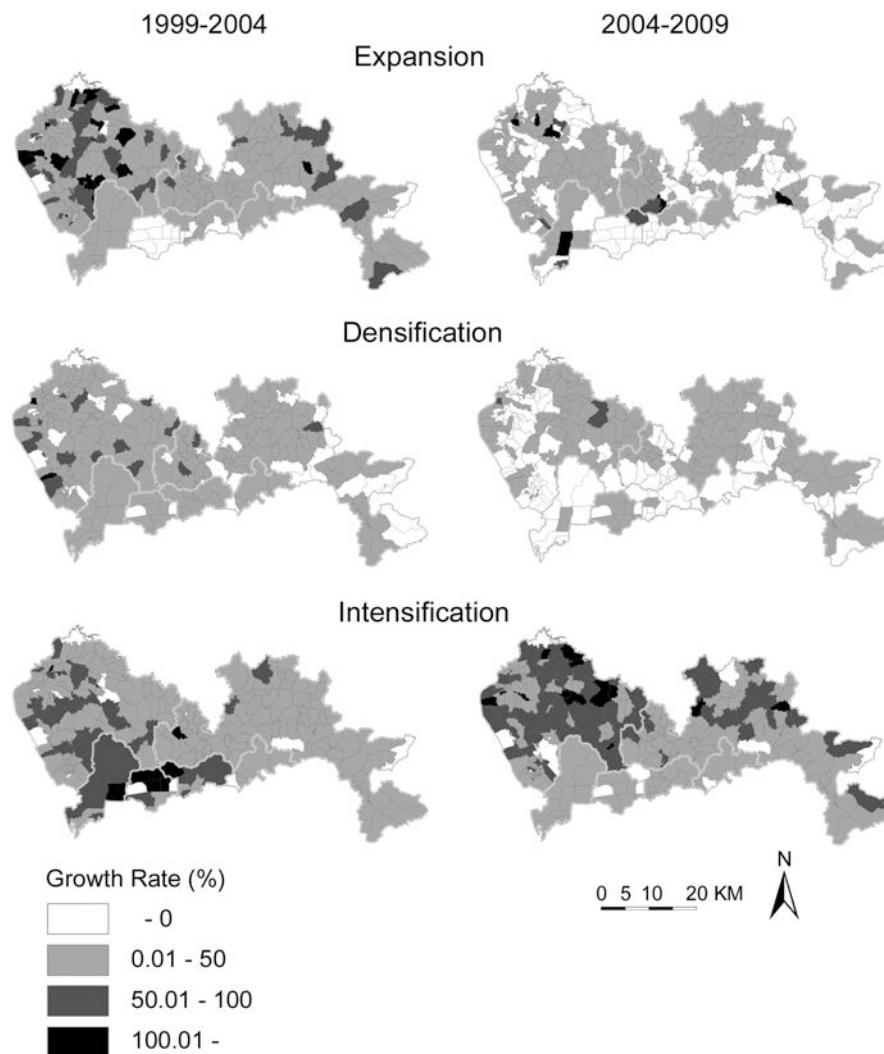


Figure 4.5 Rate of the expansion, densification and intensification of urban villages, 1999–2004 and 2004–2009.

The Master Plan (1996–2010) was then introduced to expand the planning area to include the two new districts, and a major focus of the plan was to deal with unplanned growth in areas outside the SEZ, though it was not fully successful (Zacharias and Tang, 2010). The urban villages then developed rapidly in the face of the growing population. In the SEZ, the economic restructuring from industry to tertiary sectors started from the beginning of the 1990s, and continued throughout the 2000s. As industries were gradually shifted to the outlying districts or inland cities, urban villages in the SEZ increasingly accommodated various types of tertiary sector workers, rather than just industrial workers. Consequently, through intensification, the growth of floor space in these urban villages continued.

In the second period, the expansion and densification rates slowed down significantly, especially within the SEZ. In addition, there were significantly fewer urban villages experiencing expansion or densification in the second period than in the first period. However, the intensification rates of urban villages remained high in the second period. All the urban villages that experienced the highest development rates were outside the SEZ. These patterns manifested themselves in the three development phases at the city scale, which temporally and spatially overlapped with each other. Initially the development of urban villages in the outer districts lagged behind that of those in the SEZ, but they have since been catching up rapidly.

4.4.2 Implications and impacts of the redevelopment programme

To implement the Master Plan of Urban Village Redevelopment, annual redevelopment plans were introduced from 2005 until 2008, in which urban villages were prioritized for redevelopment according to the city's development prospects. Emphasis was placed upon major administrative and commercial areas (such as city centres, district centres, and sub-district centres), major industrial development areas (such as industrial parks and logistical parks), major scenic areas (such as ports of entry from Hong Kong, main avenues, and tourist sites), and areas involved with major infrastructure construction (such as metro lines). In these four annual plans, 137 redevelopment projects for complete or partial redevelopment of urban villages were set out. The targeted urban villages were distributed over 77 of the 255 analysis units that contain urban villages.

Although the population of migrant tenants has been rapidly increasing, the population of indigenous villagers has remained quite stable. Since urban village development is based on a self-help approach by the indigenous villagers with limited external capital injections, their capacity for dwelling unit production does not vary much over time. As a result, the absolute growth of

urban villages is representative of the efforts and progress in housing development made by the indigenous village population. Furthermore, for the 137 selected villages, any variation in growth before and after the implementation of the redevelopment programme could be an indicator of the programme's impact on local investment in housing. For this reason, in this section we evaluate the absolute changes instead of the relative changes of urban villages' land area, built-up area, and floor space.

The independent *t*-tests reveal the differences between the absolute growth of selected and non-selected urban villages in terms of land area, built-up area, and total floor space (Table 4.3). In the first period, on average, the selected urban villages experienced slightly greater land expansion, greater growth of built-up area ($t = 2.7$, significant at the 1% level), and greater growth of total floor space ($t = 4.4$, significant at the 0.1% level), as compared to the non-selected villages.

Table 4.3 Comparison of development between selected and non-selected urban villages (unit of the means: 10^4 m^2).

Statistics	Variable tested					
	Land area	Land area	Built area	Built area	Floor area	Floor area
	99–04	04–09	99–04	04–09	99–04	04–09
<i>t</i>	0.896	1.700	2.661	0.424	4.413	2.658
df	116	100	103	94	87	93
P (2-tailed)	0.372	0.092	0.009	0.673	0.000	0.009
selected	77	77	77	77	77	77
non-selected	178	178	178	178	178	178
Mean (selected)	9.1	4.7	5.7	1.3	33.7	28.8
Mean (non-selected)	7.8	2.3	3.8	1.1	14.7	17.3

As the redevelopment programme was not introduced or implemented until 2005, the result of the comparison shows that prior to the introduction of the programme, the selected urban villages evidently experienced more significant growth than others. This is not a coincidence, as the selection conducted by planning authorities was based on the evaluation of potential for redevelopment in terms of both the interest for the government to realize spatial planning and to 'release the suppressed land value' (observation made by a local planner). Thus, well-located urban villages, such as those in city centres, close to metro stops, or beside major roads, were selected and these urban villages were inevitably also the most popular in the urban village housing market. Besides, rumours about redevelopment or the official introduction of redevelopment programmes

would have motivated the indigenous villagers of affected villages to quickly construct more housing units in order to claim higher compensation.

In the second period, on average, the selected urban villages experienced greater land expansion, greater growth of built-up area, and significantly greater growth of total floor space ($t = 2.7$, significant at the 1% level), as compared to the non-selected villages. As we have seen previously (Table 4.2), the expansion and densification of urban villages slowed down significantly in the second period; this was true for both selected and non-selected villages. However, as intensification continued in the second period, the growth of total floor space of the non-selected urban villages was higher in the second period. For the selected villages, the implementation of some redevelopment projects led to a reduction of floor space, which to some extent balanced out the growth of others. As a result, the growth of floor space in the selected urban villages was lower in the second period than in the first.

Both before and after the redevelopment programme was introduced, the selected urban villages experienced more growth than the non-selected ones, despite the programme's aim to demolish and redevelop them. This indicates that the selected villages attracted a stronger influx of migrant tenants than the non-selected ones, reinforcing the view that they are the most popular and successful urban villages in Shenzhen's low-income housing market. These urban villages have been accommodating a rapidly rising population of tenants and thus are very profitable for the landlords. In this situation, the government has been competing with indigenous urban village populations and their migrant tenants for the same villages. It explains the extreme difficulty that exists regarding the implementation of the redevelopment programme, and in particular its slow progress. As was recently reported: 'So far, the government [of Shenzhen] has succeeded in acquiring only a tiny proportion of village land, usually located in strategic and visible locations' (Zacharias and Tang, 2010, pp.230). In these redevelopment projects, a lot of public resources were devoted to ensure successful redevelopment, which is something that is too costly to be replicated on a large scale elsewhere.

4.4.3 The spatial clustering of urban village development

The Moran scatterplots (Figure 4.6) illustrate four categories of spatial association of the growth of urban villages. The Moran's I coefficient of the growth of urban village land for the first period is 0.36 (significant at the 0.1% level), indicating a significant positive spatial autocorrelation. This means that urban villages with a similar geographic location tend to expand at more or less the same scale and thus village expansion tends to cluster in certain places. For the second period, the Moran's I coefficient is 0.08 (significant at the 5% level),

indicating no evidence of growth clustering. As the expansion of urban villages slowed down significantly in the second period, the concentration pattern of the expansion also diminished.

The growth of the built-up area of urban villages exhibits significant positive spatial autocorrelation for the first period (Moran's $I = 0.35$, significant at the 0.1% level), but relatively less significant autocorrelation for the second period (Moran's $I = 0.20$, significant at the 0.1% level). The trend is similar to the one observed for village land expansion. In the first period, the growth of the built-up land was spatially clustered, but as both the expansion and the densification significantly slowed down, the clustering of the growth of the built-up area was less pronounced.

For the growth of the total floor space of urban villages, the statistics reveal significant positive spatial autocorrelation for both time periods, with the Moran's I coefficient values being 0.31 and 0.34 for 1999–2004 and 2004–2009, respectively (both significant at the 0.1% level). These values indicate that the intensification was sustained in both periods and that the spatial clustering of the growth of floor space was also pronounced. Consequently, high growth is related to prominent clustering of the growth, while low growth is less clustered. The comparison of the clustering patterns of the growth of land area, built-up area and floor space is in line with the three development phases of urban villages.

The LISA cluster maps (Figure 4.7) show the distribution of the urban village development clusters in terms of land expansion, built-up area increase, and total floor space increase. For the first period, the high-high units of land expansion were clustered into two groups. One was in Baoan district, adjacent to Futian district, where the new city centre is located. The other cluster was in Longgang district. As the land growth involved the construction of new buildings, the growth of the built-up land was concentrated in the same areas. However, for the growth of floor space, the concentration was closer to the new city centre. Owing to the lack of vacant land in the SEZ, the clusters of the least land expansion were in the SEZ. The clusters of the least growth of built-up area and floor space were in Dapeng Peninsula, in the remote eastern part of the city.

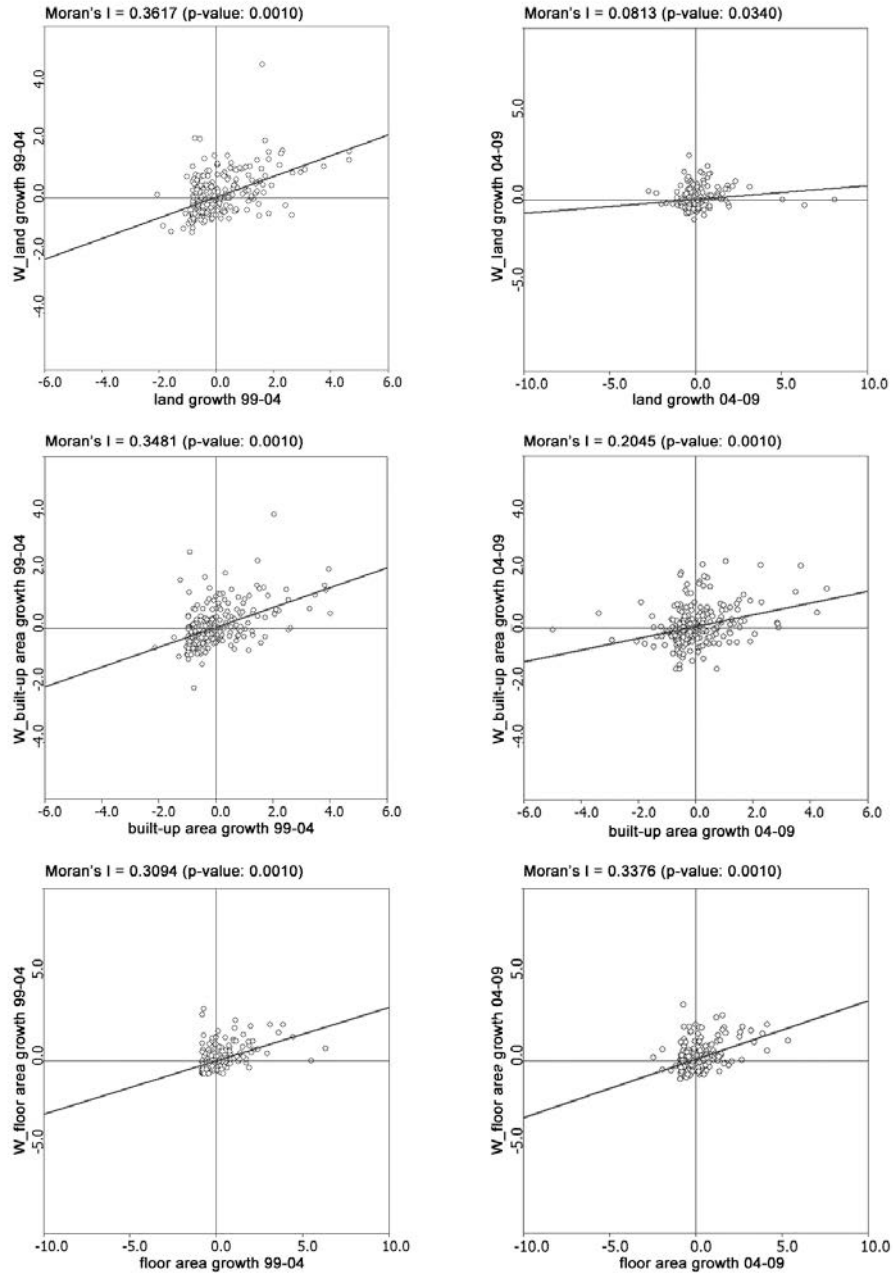


Figure 4.6 Moran scatter plots of the growth of gross land area, total built-up area, and total floor space of urban villages, 1999–2004 and 2004–2009.

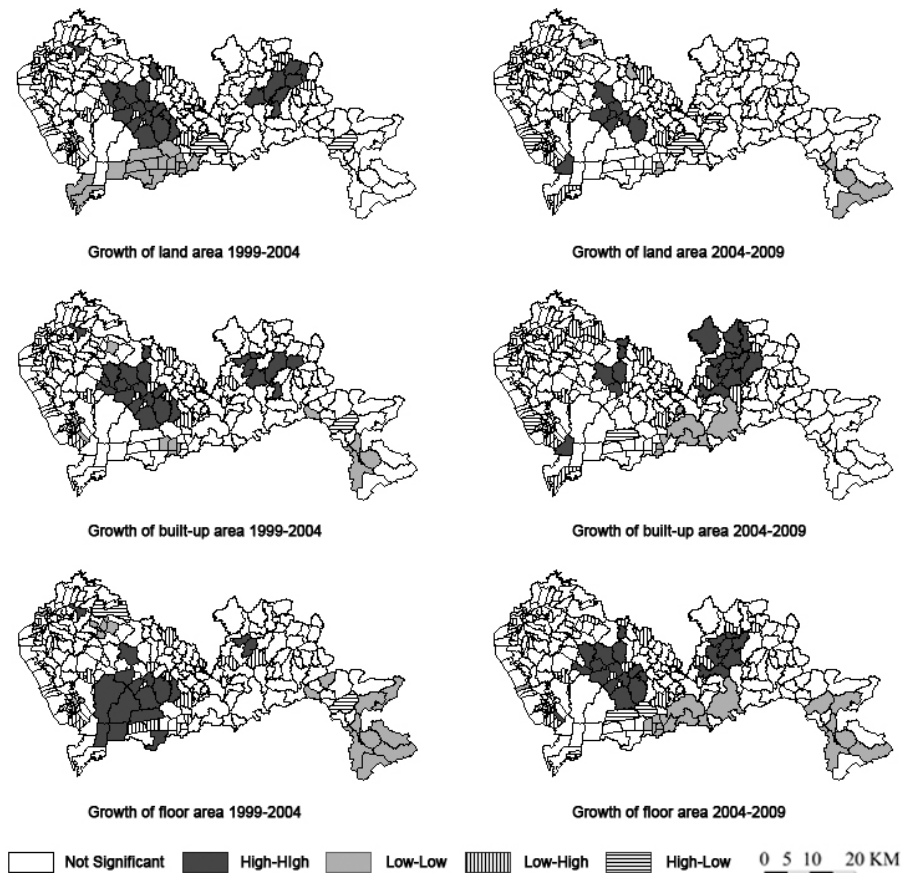


Figure 4.7 LISA cluster maps of the growth of land area, built-up area and total floor space of urban villages, 1999–2004 and 2004–2009.

For the second period, the land expansion clusters were smaller. The high growth of built-up area clusters were close to the high land expansion clusters in the first period, but more peripheral. The high growth of floor space clusters correspond to the clusters of expansion and the growth of built-up area in the first period. This, from a spatial point of view, confirms our earlier finding that urban villages would first seek floor space by expanding land and then by densification and finally through intensification. The cluster of the least land expansion was in Dapeng Peninsula. For the growth of built-up area and floor space, the clusters of least growth were in Luohu and Yantian, inside the SEZ, which was in part a consequence of the implementation of some redevelopment projects. As the demolition of urban village houses is a gradual process, the

conversion of urban village land only happens when a whole piece of land is prepared for new development. However, the reduction of built-up land and floor space had already influenced the development patterns.

As the identification of spatial clusters with LISA is based on statistical methods, in which a random generator is applied, the LISA cluster map will be slightly different when the random generator is run on subsequent occasions. This is not a problem for the high-high or low-low clusters because only the boundaries of the clusters will slightly change (at the boundaries of the clusters, some significant units would change into non-significant units, and vice-versa), but the locations and sizes of the clusters do not vary significantly. As for the high-low and low-high clusters, however, which usually comprise fewer units, the clusters are not stable. Interpreting the results for these groups is therefore precarious.

The analyses have shown that there is great variation in urban village development across the city. The development speed and scale of an urban village is determined by its location in the urban fabric, and so the development phases of urban villages vary across urban space. At the city scale, the development of urban villages tends to be clustered and village development manifests itself as a spillover effect from the inner to the outer districts. These patterns imply the spatial clustering of the growth of the migrant population and the possible diffusion of migrant employment out of the SEZ. The expansion, densification and intensification phases are also observed citywide, with the urban villages in the outer districts generally lagging behind those in the inner districts, but following the same general development trajectory. We have also found that the government's redevelopment programme targets the urban villages that are more popular and successful in the housing market. As a result, both the indigenous villagers and migrant tenants strongly resist the redevelopment programmes.

4.5 Conclusions and discussion

The urban villages of Shenzhen, which were transformed from rural villages on-site, are distributed throughout the city. This is different from the situation in many other developing countries, such as India (Nijman, 2010), Egypt (Harris and Wahra, 2002), and Brazil (O'Hare and Barke, 2002), where informal settlements often emerge through illegal occupation of land. Three classic phases of urban village development—expansion, densification and intensification—have been observed, though these phases also overlap with each other both temporally and spatially. In the SEZ, urban villages have mostly gone through the expansion and densification phases, but continue to produce more housing units through intensification. Urban villages outside the SEZ have

also been experiencing expansion and densification phases, but most are, as yet, less advanced in terms of intensification. The signs are, however, that further intensification should be anticipated, along the same development path of their SEZ counterparts. As urban villages are economically autonomous and embedded in their immediate locale and the city transport network, their development is significantly determined by their location in the urban fabric. Major density concentrations of urban village development were found in the city's prime development areas, but the pattern also shows a spillover effect from the inner to the outer districts.

These development processes show some distinctive characteristics different from many other informal settlement types. For instance, 'slums' in India (O'Hare et al., 1998) and 'informal settlements' in some African countries (Sliuzas, 2003) exhibit rapid expansion and densification similar to that seen in Shenzhen, but the physical condition of the buildings and infrastructure tend to be inferior and many do not evolve further through intensification. Comparatively, urban villagers have advantages in financing measures, which support the costly construction of multi-storey concrete buildings and infrastructures. The infrastructure provision, including tap water, sanitation, and electricity is much more sufficient in urban villages, and consequently a larger density of residents can be accommodated. Moreover, the urban village's landlords enjoy more land security and thus do not face the constant threat of eviction and demolition by the government or private landowners, as slum-dwellers in many other contexts do. That said, there are also other instances where similar development processes can be found. In other cities of the developing world, such as Istanbul (Bugra, 1998), Cairo (Fekade, 2000), Nairobi (Huchzermeyer, 2007), and Rio de Janeiro (O'Hare and Barke, 2002), semi-formal residential development also takes the form of multi-storey buildings, often violating building regulations and infrastructure standards.

Probably the most important peculiarity of the urban village is that, under the Chinese land system, only the indigenous ex-farmers are entitled to property rights on urban village land and houses, and they are not allowed to sell their properties except to the local government. This is different from the situation in other contexts, where semi-formal properties can be transferred to other individuals or housing development companies, which often results in speculation and severe inflation of property prices and rents (Fekade, 2000; Huchzermeyer, 2007). As a result, the increase in rent of urban village housing has been very slow when compared to the rents in the formal housing market. Moreover, whereas informal settlements in other contexts may be built solely by migrant households, the indigenous villagers of an urban village represent a clan-based society, whose members have lived together for generations, with shared cultural and historical values, and with much social and economic cooperation. This high level of cohesion enhances the resilience of their housing

development and rental businesses to government regulations and contributes to the exceptional physical development level of their villages.

It is expected that China's urban growth will continue to accelerate in years to come (Song and Ding, 2009). As a subsidized housing scheme for rural migrants is still absent in most cities, low-cost housing such as that provided by urban villages is likely to remain in great demand and is very important for the urban labour market's functioning. Shenzhen's experience in implementing the large-scale redevelopment programme shows that there are considerable barriers to be overcome before such policies can be rolled out at the scale envisaged, and even then, many more villages will remain unaffected. The analyses presented in this article reveal that those urban villages selected for redevelopment are actually the ones that are most popular and successful in the market. This gives a dangerous signal that if these urban villages are in fact redeveloped as the government intends, an important subset of the urban village housing market would vanish, possibly resulting in a severe low-income housing crisis because the choice of alternative local housing is absent, and moving to other urban villages in a more remote location substantively increases transport and time costs for low-income households. For the few implemented redevelopment cases, these were neither happenstance nor fully controlled by the government. Rather, their selection was determined by planning and development prospects for certain areas, while their implementation was determined largely by whether the developers could gain sufficient return on their investments, both of which are linked to market forces. It is the combination of the marketplace and the willingness of both the local government and the indigenous villagers to cooperate with developers that results in actual redevelopment action.

The primary driver behind Shenzhen's urban village development has been the explosive growth of migrants over the last three decades. The scale of the physical development of urban villages analysed reflects the dramatic growth of housing demand from these migrants. The development patterns and trends across space and time further indicate, if not perfectly, the variation in the distribution of Shenzhen's vast migrant population. Officials in Shenzhen and other Chinese cities in which urban villages form a substantial component of the low-income housing market would do well to consider whether and how intervention strategies could be broadened to include responses that might avoid mass demolition and relocation. The lack of standard regulations, professional guidance for urban village development options, and enforcement measures for developments in urban villages are reasons for many of the physical problems found in urban villages today. In a situation where market forces undermine development regulations, both institutional and financial intervention measures are necessary.

As an institutional measure, enforcing building codes in urban villages is critical to ensure proper construction and the provision of adequate infrastructure. A potentially interesting option could be to investigate whether municipal planners can provide professional guidance on preferred development options for specific villages in order to improve the quality of construction and the long-term environmental quality and liveability of the villages, and by doing so also minimize building capital loss through large-scale demolition and redevelopment. To this end, policymakers can use GIS instruments and existing databases, such as citywide building surveys, to identify urban villages that suffer different levels of over-development or infrastructure deficiency and to prioritize urban villages for upgrading. Accordingly, a variety of upgrading or regeneration measures can be devised and enforced for different villages—ideally in cooperation with the indigenous villagers.

From a financial perspective, it should be acknowledged that the lucrative urban village housing market takes advantage of public investment in road extensions, metro development, and other improvements of infrastructure, while the residents obtain benefits without making any financial contributions for the provision of such services. Currently, the government can only share the value capturing now enjoyed by the indigenous villagers through government-led redevelopment. The introduction of a financial instrument, such as a property tax on urban village houses, could be an avenue worth exploring as a means to gain additional influence over urban development, including that of urban villages. It would also be a new source of government revenue, thereby reducing the dependency of local government finances on urban expansion and redevelopment. Although it can be expected that without an institutional change in the property rights of urban village land, such strategies are difficult to realize, these avenues are worth exploring as the development of urban villages is of great social and economic significance if Chinese cities are to urbanize in a more sustainable manner.

5

WHAT DRIVES THE DEVELOPMENT OF URBAN VILLAGES

Hao, P., Hooimeijer, P., Sliuzas, R. and Geertman, S. (2012) What drives the development of urban villages? *Urban Studies*, (in review).

Abstract: Dramatic urban expansion in China has encompassed many peri-urban villages and turned them into so-called urban villages. These urban villages provide a niche housing market for the rural migrants for whom the formal urban housing market is unaffordable. Understanding the development of such villages is thus important for assessing the distribution of migrants and the city's housing demand. Municipal survey data of 615,702 buildings were used to explore the variation in the built intensity of urban villages across the metropolitan area of Shenzhen. Two multivariate models that incorporate locational aspects, urban development aspects and constraints from institutional and natural aspects were constructed to uncover the driving factors of urban village development inside and outside the city's Special Economic Zone. The results support the notion that location matters and that access to employment, along with development constraints, are the most important determinants for the development of Shenzhen's urban villages.

5.1 Introduction

Urbanization causes urban expansion, dramatically transforming peri-urban environments and society. Rural lands are acquired by an expanding city, a process that exploits the large rent gap between agricultural land and urban land and affected rural settlements may sometimes also be relocated. The city, therefore, accommodates growth and a continuously expanding urban space is created. However, in the urban development of post-reform China, expanding cities often leapfrog rural settlements to reduce compensation and time costs, i.e. fields are developed, but the residential components of villages remain largely intact. This approach leads to the emergence and proliferation of so-called urban villages.

There are nearly 500 urban villages in Beijing (Mangurian and Ray, 2010) and more than 200 in Guangzhou (Tian, 2008). In Shenzhen, more than 300 urban villages accommodate half of the city's 14 million inhabitants (Zacharias and Tang, 2010). In these cities and many others, urban villages play an important role in the urban housing market and their existence shapes a substantial part of the built environment. The spatial evolution of these urban villages, although having mostly occurred in the last decade, represents a very large share of urban growth. Urban planning and management should therefore recognize the important roles that urban villages play within contemporary Chinese urban development.

Urban villages are commonly defined as villages that are spatially encompassed by formal urban development.¹⁷ Due to the loss of farmland, the traditional agricultural way of life of the indigenous population is impossible. The landless farmers thus need alternative livelihoods, and the retention of their villages' housing areas provides an opportunity to do so. Their village's prime location is exploited via the highly profitable room-rental business. Extra housing units are constructed and rooms are rented to rural migrants, who cannot access the formal urban housing system due to economic and institutional barriers. New formal commodity housing is generally unaffordable for low-income migrants and even the more affordable units generally require a local urban *hukou*, meaning they too are unavailable to most rural migrants.

Urban villages form a housing market favoured by rural migrants by virtue of relative affordability and accessibility. As in-migration and city expansion continue, new urban villages are created at the fringe and increasing housing demand drives the growth of both old and new urban villages. Urban village housing and migration tend to feed off one another, helping to provide a livelihood for the landless farmers and a niche housing market for migrants.

Housing in urban villages is based on a self-help approach and tends to take place in an unauthorized style (Zhang et al., 2003). This enables quick and massive constructions that provide large quantities of housing units to satisfy demand. However, the pursuit of larger profits by maximizing the use of available land leads to many negative externalities, such as over-development, poor infrastructure, chaotic land use, and a lack of open space. These issues create a breeding ground for health hazards, fire hazards and crime, further

¹⁷ Urban villages include collectively-owned development land, which solves the unemployment problem during the expropriation process. Our definition of urban villages considers only the residential components of villages. However, in the measurement of the ratio of non-residential use, we examine the floor space of urban village buildings outside the residential components of the villages.

confusing the general perception of the contributions urban villages make to migrant housing. Such negative views result in many actions to ‘cure’ the ‘urban village disease’ (People's Daily, 2004; Chung, 2009). Official policies often aim foremost at demolition and redevelopment of these areas into large-scale modern living and service facilities, allowing them to be absorbed within the formal administration system under government control. However, this approach has been widely criticized for jeopardizing the migrant housing market (Zhang et al., 2003; Song et al., 2008).

Understanding the development of urban villages is important for assessing the housing demand from migrants. It can also help to develop strategies that can curb the most undesirable developments or illegal constructions. To these ends, this paper explains the physical growth of urban villages in Shenzhen, one of China's most dynamic cities. Specific explanations are given for the variations in spatial development of urban villages across the city. A multivariate model with cross-sectional data of all urban villages in Shenzhen in 2009 is used to uncover the drivers of urban village development. Our hypothesis for Shenzhen is that access to employment is the primary determinant of urban village development, while some variation will also exist due to development constraints imposed by institutions and the natural topology of specific urban villages. Implications for urban planning and policies in coping with the current state and future development of urban villages in Chinese cities are discussed.

5.2 Characterization of urban village development

Urban villages, due to their unofficial and illegitimate characteristics, are generally viewed as a form of informal settlement in China (Zhang, 2005; Wang et al., 2009). Physically and socioeconomically interwoven with surrounding formal areas, they can also be seen as an integral component of urban land use (Hao et al., 2011). In this section, we examine findings from past research on classic urban land use models and informal settlement patterns. Thereafter, we develop a conceptual model of the spatial evolution of urban villages in rapidly growing Chinese cities.

5.2.1 Urban villages as urban land use

Urban village development, mostly by unauthorized construction of housing, reflects an appropriate response to the observed demand for housing and the entrepreneurial spirit of the indigenous population in exploiting such economic opportunities. It is also a result of the urban development process in their environs.

The characteristics of urban development in Western and Chinese cities have been evaluated by many researchers using an urban-to-rural gradient paradigm. The model was first based on a simple linear gradient concept and has been evolving to include gradients of disturbance, land-use intensity, and the polycentric, anisotropic nature of modern cities (see for example, Bunting et al., 2002; Yue et al., 2010). One of the classic analytical models is the bid-rent curve (Alonso, 1964), which shows how the price and use of land are determined and land will be devoted to the use that achieves the highest return per unit of land. The mechanism by which the scarce land resource is allocated is economic rent, which is the surplus income that can be obtained from one unit of land above what can be obtained from an inferior unit of land. It can also be regarded as a measure of the level of return that the market at large would expect a particular piece of land to produce. Distance to the CBD is the main factor that determines the land rent.

For our purpose, we use a likewise simplified model, in which the basis of determining the bid rent of the land is the friction of distance; that is, the only advantage that one piece of land can have over another piece of land is its location in relation to the market of labour and goods. For instance, for residential use, the closer a piece of land is to the city centre, the higher its economic value; and, as this distance increases, the bid rent decreases as a function of the distance (see Figure 5.1, curve at t_0). Outside urban areas, however, the bid-rent curve for residential use is not relevant for rural villages. As agricultural production uses relatively large amounts of land compared with manufacturing or services, fewer labourers are involved in the unit of land. In rural villages there are generally fewer residents and most are local farmers.

As the city expands to form urban villages (see Figure 5.1, curve at t_1), the land ownership of the villages remains intact. The specific occupancy of a house plot (*zhaijidi*) turns each village family into a *de facto* landlord with unrestricted tenure (Zhang et al., 2003). However, the collective ownership of village land does not allow villagers to alienate their lands, except to transfer ownership to the government. Besides, the villagers cannot violate the dwelling use of their housing land, the *zhaijidi*, whose market value significantly rises, climbing up the bid-rent curve. Consequently, the village land use is in an awkward situation, where a much higher market value is expected but the tenure situation prevents a market-led redevelopment from happening. Moreover, the sub-standard living environment and unofficial status of urban village housing limit the rents, which are dramatically lower than formal housing in the same location.¹⁸ Therefore,

¹⁸ In 2005, rent for urban village housing in Futian district was 15–30 RMB per m² per month (UPDIS, 2005a), while the price for formal housing was 20–70 RMB (Editorial Committee, 2006).

the only option for gaining a higher total rent per land unit is through mass production of housing units. In this way, the bid-rent gradient is exhibited through the floor space intensity per land unit, which enables higher total rent per land unit. Consequently, the closer the urban village is to the city centre, the greater built intensity one can expect.

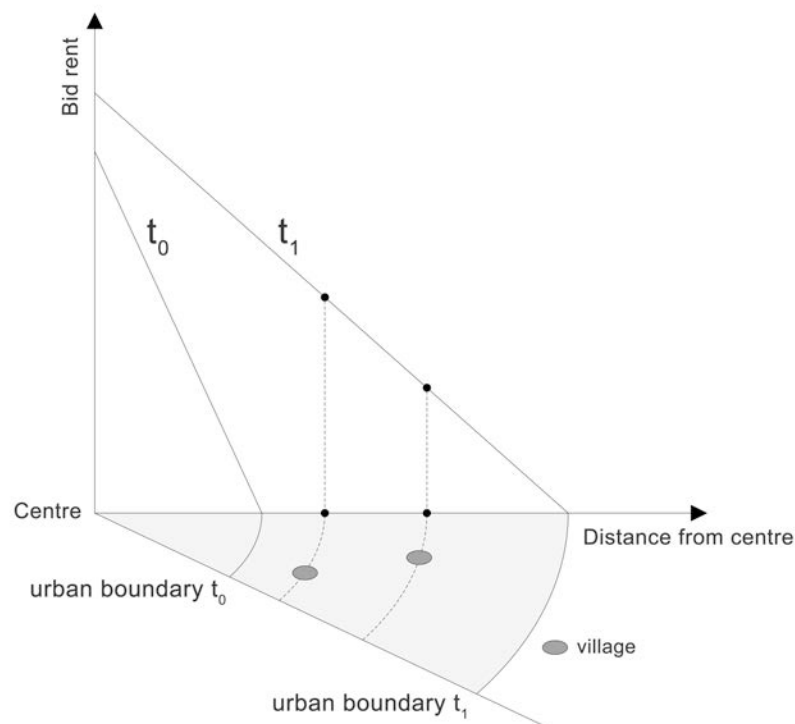


Figure 5.1 Location bid for villages encroached by urban development.

5.2.2 Urban village development

Turner (1968) found that the development pattern of housing in developing countries is based on three basic functions of the dwelling environment: it must have an accessible location; it must provide secure residence for a minimum period; it must provide a minimum of shelter from hostile climatic or social elements. Especially for the poor, the perfect housing choice is then to live in

close proximity to employment opportunities, where subsistence goods and available housing are cheap, and transport costs and time are negligible. The urban village, by its very nature, tends to have relatively good accessibility. Housing units are rented at cheap prices and with flexible contracts. They are made of durable materials and reasonable infrastructure and services are provided. Therefore, in all three aspects, urban villages qualify as a desirable housing choice for migrants. In Guangzhou and Shenzhen, surveys indicate a considerably high level of satisfaction by urban village residents (Zhang et al., 2003; Urban Planning and Design Institute of Shenzhen, 2005a).

Unlike many informal settlements elsewhere that may emerge in the centre or at the fringe of a city, an important peculiarity of China's urban villages is that their core always existed prior to the formal city. As the location of an urban village is pre-determined, its popularity as a housing neighbourhood depends on its relative advantage in terms of accessibility and quality within the urban village market. Rural migrants to the city, mostly young and single, are primarily concerned with getting a job and a reasonable income. For young migrants, a cheap room or even a bed space in an urban village near to the work place is a main aim, and naturally the priority in terms of the proximity to their job and to services, such as central urban areas, is therefore very high. The arrival of migrants in large numbers thus drives the development of urban villages, especially the most popular ones.

The pre-existing rural landscape of the villages—relatively low-density residential settlements surrounded by farmland—determines the initial setting of the urban village development. This includes their original size, layout and natural landscape. Once an urban village is formed, densification through infill and intensification by increasing the height of buildings are the only methods to increase floor space: yards are occupied by housing extensions and new houses, open spaces are developed, roads are narrowed, and traditional low-rise houses are replaced with concrete high-rise apartment buildings (Figure 5.2). The design and construction of urban village buildings are not constrained by a building permit, nor are inspection and approval procedures used to specify construction standards. Dwelling expansion and modifications for renting purposes therefore proceed largely unimpeded, substantially reducing construction costs and enabling low rent. Consequently, the dramatic physical growth of urban villages is sustained.



Figure 5.2 An urban village in the urban landscape of Shenzhen.

5.2.3 Conceptual model for urban village development

To examine this growth we use floor space density (FSD) to measure the outcome of the physical growth of urban villages, which is calculated by

$$FSD_i = \frac{\sum_j F_{ij}}{A_i}$$

where F_{ij} is the floor space of building j in urban village i ; and A_i is the land area of urban village i .

The FSD of an urban village not only reflects the degree to which the urban village land is exploited, but it also roughly infers the demand for migrant housing as well as the population density of urban villages.

As urban development is diverse, urban villages situated in different urban settings (e.g. in the central business district, adjacent to an industrial park, or at the fringe of the urban development area) should also be facing different levels of housing demand. This may cause variations in their development. Thus, we

need to consider developments in the environs of urban villages, which provide employment and services necessary for the livelihood of migrants.

Moreover, with urban transportation, some places have impacts beyond their immediate surroundings. For instance, the city centre is the most important place in terms of the provision of jobs and services. More central urban villages are likely to face higher housing demands and thus their land tends to be more intensively used. Other places, such as sub-centres and nodes of public transport, are also likely to influence urban village development.

Natural and institutional constraints will also affect development. For instance steep-sloping land implies higher construction costs, and environmental protection zones may also restrict development. Another constraint arises from formal urban development in the urban villages' environs. Over time, formal urban development encroaches on urban villages, placing greater pressure on the remaining land resources and encouraging more intensive developments.

The combined effect of these factors is a great variation in FSD of urban villages which can be observed at any one time. In the next section we analyse the FSD of urban villages in Shenzhen, to determine the driving forces of their development.

5.3 Urban village development in Shenzhen

The impact of the different factors on the built intensity of urban villages is tested through an ordinary least square regression model with cross-sectional data covering all urban villages in Shenzhen in 2009. Before doing so a brief introduction to the city is provided.

5.3.1 Study area

Shenzhen is a fascinating city in terms of its development speed and scale (Leaf, 1996; Cartier, 2002). Three decades ago, it was an agricultural area adjacent to Hong Kong. In 1980, it was strategically selected for what was then a radical experiment with market economic activity. Its emphasis on export-oriented industry has enabled it to become a major manufacturing centre, which attracts millions of migrant workers. In 2009, Shenzhen covers 1969 km² and houses 14 million inhabitants.

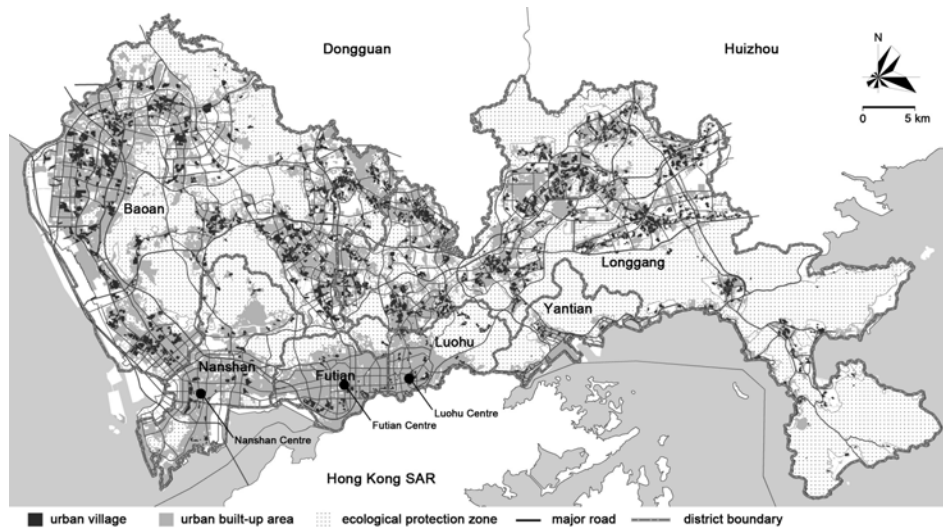


Figure 5.3 The distribution of urban villages in Shenzhen (Source: Shenzhen Urban Planning Bureau).

Shenzhen's rapid economic growth is reflected by the equally large-scale mass production of the built environment and urban space. Urban growth has resulted in 318 urban villages in the form of thousands of settlement fragments distributed over the city (Figure 5.3), a legacy of the original farming and fishing communities. In 2009, urban villages provided a total floor space of 173 million m², equivalent to 42% of the total floor space of residential buildings, or 23% of the total floor space of all buildings in Shenzhen. It is thought that urban villages accommodate more than seven million people, both indigenous villagers and rural migrants who form the vast majority (Zacharias and Tang, 2010). The physical growth of urban villages during 1999–2009 was striking, contributing to an increase in total floor space of 105 million m². By contrast, the total floor space of completed commodity housing in this period was only 58 million m² (Shenzhen Statistics Bureau, 2010).

5.3.2 Data

The data employed were primarily from the Shenzhen Municipal Building Survey 2009, which contains 615,702 building records with attributes including address, ownership, function, plot area, built-up area, floor space, height, and number of storeys. Data for 4018 buildings under construction were also included. Using the boundaries of urban villages and ownership data of the

buildings provided by the Shenzhen Urban Planning Bureau (SUPB), 324,439 buildings were identified as private urban village properties.

Contextual data, provided by the Shenzhen Urban Planning and Design Institute (UPDIS) and the Shenzhen Urban Planning and Research Centre (SUPRC), were used to examine factors that may influence urban village development. These include administrative boundaries, road networks, metro lines, industrial parks, various city planning documents, and the locations of city centres, sub-centres, and checkpoints to the SEZ.¹⁹ The Shenzhen Trade and Industrial Development Bureau provided employment data for mid- and large-scale manufacturing enterprises (annual gross turnover above five million RMB).

Land elevation information for the whole area of Shenzhen was derived from the ASTER Global Digital Elevation Model (DEM). Its resolution was reduced from 15 m pixels to 150 m pixels to reduce the noise generated by buildings or other objects. A slope map was produced and the average land slope of each urban village was calculated.

5.3.3 Empirical model

As discussed in section 5.2, hypothetically there are three classes of factors that influence the development of an urban village: the provision of jobs in the village's immediate surroundings (opportunity); the accessibility to job locations from the village (accessibility); and institutional and natural constraints that may hinder the development of the village (constraints). Consequently, the FSD of an urban village is a function of these three factors.

As Shenzhen's urban villages normally comprise many separate settlements, the location of an urban village is difficult to represent. To solve this problem, we used the location of each building of the urban village to calculate the availability of jobs in a building's surroundings, as well as the accessibility from the building to job locations or transport nodes. Then we took the mean value for all buildings in the urban village to average out the village-level values.

The three factors are evaluated by a group of variables. The definition of these variables and their measurements are given in Table 5.1 and they are described in the following paragraphs.

¹⁹ Entry into the SEZ was controlled until mid-1990s.

Table 5.1 Description of independent variables.

Variables	Type	Description
employment	O	mean employment stock of mid- and large-scale manufacturing enterprises in 2 km radius of every urban village dwelling building
floorspace_industrial	O	mean floor space of industrial buildings in 2 km radius of every urban village dwelling building
floorspace_tertiary	O	mean floor space of tertiary sector buildings in 2 km radius of every urban village dwelling building
floorspace_construction	O	mean design floor space of buildings under construction in 2 km radius of every urban village dwelling building
distance_subcentre	A	mean road distance to nearest sub-centre from every urban village dwelling building
distance_metro	A	mean road distance to nearest metro stop from every urban village dwelling building
distance_sez	A	mean road distance to nearest checkpoint of the SEZ from every urban village dwelling building
distance_indpark	A	mean road distance to nearest industrial park from every urban village dwelling building
distance_majorroad	A	mean linear distance to major city road from every urban village dwelling building
distance_minorroad	A	mean linear distance to minor city road from every urban village dwelling building
distance_GSexpressway	A	road distance from urban village to nearest entry of Guangzhou–Shenzhen expressway
land area	C	land area of urban village
ratio_non-residential	C	ratio of non-residential floor space in total floor space of all types of buildings owned by urban village
land slope	C	dummy: 1, average slope of urban village land above five degrees, otherwise 0.
ecological zone	C	dummy: 1, proportion of ecological protection land in urban village above 30%, otherwise 0.
restricted zone	C	dummy: 1, proportion of development restricted area in urban village above 30%, otherwise 0.
water protection zone	C	dummy: 1, proportion of water protected area in urban village above 30%, otherwise 0.

To measure the opportunity factor, employment stock of manufacturing enterprises within a radius of 2 km of the urban village building was calculated. This measures the local job pool within 30-minute walking distance from urban village housing (Lin et al., 2011). The data includes only relatively large manufacturing enterprises that are registered. As a result, a great deal of employment provided by non-manufacturing enterprises, the informal sector, small-scale enterprises, and self-employment are overlooked. To overcome this problem, we introduced a series of proxy variables to give a comprehensive representation of employment capacity in the urban village's immediate surroundings. These variables were: the floor space of industrial buildings within a 2 km radius of urban village buildings; the floor space of tertiary sector buildings within a 2 km radius of urban village buildings²⁰; and the design floor space of buildings under construction within a 2 km radius of urban village buildings. We expected that these variables positively influenced the concentration of migrants and thus stimulated the FSD of the urban villages involved.

To measure the accessibility factor, we used road distance to represent distance for most variables, since vehicle-based transportation is the dominant means of long-distance passenger transport in Shenzhen (Zacharias and Tang, 2010). Longer distances to job locations raise commuting costs. Besides, it also increases the uncertainty and risks involved in seeking jobs, as information about more distant places is generally less readily available. The accessibility factor was represented by a group of proximity variables, including road distance to the nearest sub-centre, road distance to the nearest SEZ checkpoint, and road distance to the nearest industrial park. The expectation was that the lower the distance to job locations, the greater the FSD of urban villages.

We also included four other proximity variables: road distance to nearest metro stop; linear distance to major city road; linear distance to minor city road; and as the Guangzhou–Shenzhen expressway is of special importance for inter-city transport (connecting the SEZ, Nanshan port, Shenzhen airport, and the provincial capital city Guangzhou), road distance to the nearest entry of the expressway from the urban village was calculated. The expectation was that proximity to important nodes and segments of the transport network entails a significant advantage in accessibility, and thus drive FSD in urban villages.

²⁰ The floor space for commercial and public services are combined to be floor space of tertiary sector buildings.

The constraints were represented by six variables: a dummy variable, indicating if the average slope of the urban village is above five degrees (construction costs should increase with slope); land area of the urban village indicating the scale of the urban village (bigger urban villages are likely to be more powerful financially and politically, and thus are expected to experience more intensive development); a dummy variable indicating whether more than 30% of the land overlaps with ecological protection zones, or construction-restricted zones, or water body protection zones. The presence of a large overlap with such zones was expected to hinder the physical development of urban villages.

The sixth constraint factor relates to the effect of redevelopment which some urban villages have already undergone. The remaining parts of these villages will face greater land pressure and tend to experience more intensive development. Moreover, in the face of pressure given by formal urban development, urban villagers are more likely to relinquish their collectively controlled properties, which are usually for non-residential use. We capture the effect of redevelopment pressure from the formal city by measuring the ratio of floor space of non-residential use of urban village buildings, which is expected to be negatively related to their FSD.

The SEZ and the outer districts accommodate different economic sectors, which offer different job markets. The tertiary sector tends to concentrate in the SEZ while the outer districts accommodate most of the city's industrial development and informal sectors. Consequently, different social groups of migrants are unevenly distributed on either side of the SEZ border. An official survey (UPDIS, 2005b) revealed that, the SEZ's urban villages accommodate white-collar employees, service sector staff and university graduates. However, in the outer districts, urban village tenants are mostly industrial workers, service sector employees and small business owners or employees.

Given the significant heterogeneity of urban development and the population in these two areas, separate models were built for the SEZ and the outer districts. The selection of independent variables for these models was slightly different. For example the metro only operates in the SEZ. For the outer districts model, the variables of distance to the nearest sub-centre and distance to the SEZ were included, as both places provide a substantial amount of job opportunities and thus would be attractive for migrants. We included the employment stock variable only in the SEZ model, because in the outer districts the employment stock variable is strongly correlated with the industrial floor space variable (because of the overwhelming representation of enterprises by industrial companies).

The descriptive statistics for SEZ and non-SEZ urban villages are shown in Table 5.2 and 5.3 respectively. Variance inflation factors were estimated to check for multicollinearity; for the SEZ model, these were below 3.97, with a mean value of 2.00; for the non-SEZ model, these were below 3.58, with a mean value of 1.81. Since factors above 10 are usually regarded as problematic (Kennedy, 2008), there was no reason to be concerned about multicollinearity.

Table 5.2 Descriptive statistics for SEZ urban villages (89 cases).

Variable	Minimum	Maximum	Mean	Std. Deviation
Floor space density	0.829	5.299	2.807	1.054
Employment	0	79655	21022	14116
Industrial (m ²)	9053	2258493	801486	562212
Tertiary (m ²)	69902	11578064	2758985	2843728
Construction (m ²)	2993	1158779	223337	251194
Distance_metro (m)	402	26086	7207	5990
Distance_ind park (m)	358	14333	3883	3094
Distance_major road (m)	75	3156	343	438
Distance_minor road (m)	19	291	75	43
Land area (m ²)	3587	461883	100117	82905
Non-residential use (%)	0.1	18.5	3.4	3.7
Land slope (%)	0.2	16.1	3.5	3.5
Ecological zone (%)	0	100	11.2	31.3
Restricted zone (%)	0	79.4	2.0	9.9
Water protection (%)	0	35.9	1.5	5.7

Table 5.3 Descriptive statistics for non-SEZ urban villages (229 cases).

Variable	Minimum	Maximum	Mean	Std. Deviation
Floor space density	0.449	3.242	1.310	0.462
Employment	0	347566	31954	33270
Industrial (m ²)	834	6237789	2431916	1228768
Tertiary (m ²)	4888	3550786	694938	610079
Construction (m ²)	0	1434990	159370	287707
Distance_SEZ (m)	790	34144	14532	7373
Distance_subcentre (m)	325	25824	6698	4206
Distance_ind park (m)	455	17383	3074	1904
Distance_major road (m)	60	3515	431	466
Distance_minor road (m)	17	202	59	24
Distance_GSexpressway	1663	102418	35388	25228
Land area (m ²)	9202	2382011	438454	405729
Non-residential use (%)	0.1	33.0	7.5	5.6
Land slope (%)	0.1	17.1	1.9	2.6
Ecological zone (%)	0	100	5.6	14.6
Restricted zone (%)	0	79.3	1.5	7.3
Water protection (%)	0	97.4	3.2	10.9

5.4 Results and discussion

Variation in the FSD of urban villages in the SEZ (Table 5.4) and the outer districts (Table 5.5) is best explained by the combination of variables listed in the tables. The R^2 values of both models are 72% and 59% respectively, and their F -statistics are significant at the 0.001 level.

Table 5.4 Regression results for the SEZ.

Variable	B	Std. Error	Beta	t	Sig.
Ln(employment)	-.013	.036	-.043	-.365	.716
Ln(floorspace_industrial)	.093**	.039	.260	2.363	.021
Ln(floorspace_tertiary)	.077	.047	.220	1.628	.108
Ln(floorspace_construction)	.005	.035	.013	.144	.886
Ln(distance_metro)	-.203***	.058	-.434	-3.526	.001
Ln(distance_ind park)	-.096*	.052	-.164	-1.857	.067
Ln(distance_major road)	.081	.060	.124	1.359	.178
Ln(distance_minor road)	.004	.060	.005	.069	.945
Ln(land area)	-.066**	.032	-.147	-2.048	.044
Ln(ratio_non-residential)	-.071***	.023	-.213	-3.146	.002
Dummy_land slope	-.068	.114	-.046	-.592	.556
Dummy_ecological zone	-.218*	.111	-.154	-1.976	.052
Dummy_restricted zone	.025	.194	.008	.130	.897
Dummy_water protection	.196	.270	.046	.725	.471
Constant	1.195	1.344		.890	.377
R^2	.717				
F	13***				
Number of cases	89				

Dependent variable: Ln(FSD of urban village)

Significance level: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

In the SEZ, the employment of mid- and large-scale manufacturing enterprises does not positively influence on the urban villages' FSD. An explanation for this is that employees in these enterprises, which are likely to be state- or foreign-owned enterprises, are more likely to obtain a local *hukou* and/or are economically better off (Huang, 2003; Gravemeyer et al., 2011). Such enterprises also often provide housing for their workers. Thus, their employees are less dependent upon urban villages than employees of small-sized enterprises or informal sectors.

However, industrial development significantly drives the growth of urban villages both in the SEZ and the outer districts. Shenzhen's industries are characterized by labour-intensive manufacturing and substantial informal employment, which provide huge amounts of jobs for migrants. The data include all buildings used for industry, so jobs provided by small-scale and informal industrial businesses are also captured by the models.

Table 5.5 Regression results for the outer districts.

Variable	B	Std. Error	Beta	t	Sig.
Ln(floorspace_industrial)	.055**	.027	.186	2.033	.043
Ln(floorspace_tertiary)	.096***	.026	.299	3.717	.000
Ln(floorspace_construction)	.001	.009	.009	.121	.904
Ln(distance_sez)	-.136***	.030	-.270	-4.562	.000
Ln(distance_sub-centre)	-.004	.030	-.007	-.132	.895
Ln(distance_ind park)	-.009	.039	-.013	-.228	.820
Ln(distance_major road)	-.033	.030	-.057	-1.082	.280
Ln(distance_minor road)	-.032	.052	-.029	-.623	.534
Ln(distance_GSexpressway)	-.086***	.022	-.276	-3.953	.000
Ln(land area)	.056***	.020	.144	2.825	.005
Ln(ratio_non-residential)	-.082***	.020	-.204	-4.221	.000
Dummy_land slope	-.011	.104	-.006	-.109	.914
Dummy_ecological zone	-.101	.083	-.060	-1.217	.225
Dummy_restricted zone	.097	.152	.029	.638	.524
Dummy_water protection	.342**	.139	.120	2.468	.014
Constant	-.262	.910		-.288	.774
R^2	.590				
F	20***				
Number of cases	229				

Dependent variable: Ln(FSD of urban village)

Significance level: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

The tertiary sector also drives urban village development though its effect is more significant in the outer districts than in the SEZ, reflecting the different development status of tertiary activity in and outside the SEZ. Commercial development and public services in the outer districts are relatively low-key and also have a substantial informal component, while the SEZ is geared towards mid- and high-end customers and skilled workers. Consequently, tertiary sector employees in the outer districts are more likely than their SEZ counterparts to depend upon urban village housing.

With Shenzhen's transformation to a teeming metropolis in barely one generation, construction workers have long formed a substantial proportion of the migrant population. Although both models show a positive relation between construction and urban village's FSD, this is not significant. An explanation could be that construction workers are often provided with temporary shelters on construction sites. Even for those who do find rooms in nearby urban

villages, room sharing with co-workers is common because of their low wages, which reduces the aggregate demand for housing space.

In the SEZ, the proximity to metro stops is the most influential determinant of the FSD of urban villages. Metro stops are often located in activity centres, and great accessibility can be obtained from metro lines and nodes of other public transport modes that are linked to the metro. Consequently, urban villages close to metro stops are very attractive living places.

In the outer districts, proximity to the SEZ with its enormous amount of job opportunities positively affects the urban village's FSD. However, the effect of proximity to sub-centres is not significant, reflecting their much lower economic importance.

Industrial parks, accommodating clusters of industrial enterprises, provide a substantial amount of jobs to migrants. With the help of public transport, their influence extends beyond the immediate vicinity, and proximity to industrial parks could thus be a strong driver for urban village development. In both models, this was found to be true; however, in the outer districts the effect was not significant. As industrial parks in the outer districts are often equipped with workers' dormitories, they are less dependent upon housing from neighbouring urban villages. However, due to the higher land value and their relatively smaller size their SEZ counterparts seldom provide workers' housing facilities. Within the SEZ industrial workers thus have to find other cheap housing, causing a significant impact on near-by urban villages.

Distances to major and minor roads are measures of accessibility from various parts of an urban village to the city road network. It was expected that the FSD of urban villages would be higher closer to the road network, but as the road network in the SEZ is quite dense, no such effect was detected. In the outer districts, positive but insignificant relationships with major and minor roads were found. Furthermore, the Guangzhou–Shenzhen expressway has a great impact on the urban village's FSD. The villages with better access to the expressway have a significantly higher built intensity than others.

In the SEZ, smaller urban villages have a significantly higher built intensity; while in the outer districts, bigger urban villages show higher intensities. This difference reflects the different development stages and conditions in the SEZ and the outer districts. SEZ urban villages are under higher pressure from formal urban development and some are even threatened by total redevelopment. Through partial redevelopment many urban villages are becoming smaller. In the outer districts, formal urban development has not exerted direct pressure for large-scale redevelopment and urban villages are in early phases of

development. Bigger urban villages may imply stronger political and financial power, both of which positively influence FSD.

The ratio of non-residential floor space is negatively related to the built intensity of urban villages in both the SEZ and non-SEZ. This implies that the development of the formal city not only drives the development of the residential components of urban villages, but it is also encroaching on urban villages. The collectively-owned properties characterized by multiple non-residential functions tend to be converted first, leading to a lower ratio of non-residential use and higher FSD in the village's residential areas.

The effect of various constraints was also variable. No significant effect was found between slope and FSD, as the average slope of most urban villages is quite low (below 10 degrees). Ecological protection zones show the expected negative impact, but only in the SEZ. Restrictive zoning is not significant, while water body protection actually has a positive rather than a negative effect on urban village's FSD. Only the ecological protection zone legislation entailed some control on urban village development and this only happened in the SEZ where development control enforcement is much stricter. Meanwhile, proximity to a water body may actually increase the environmental quality of the urban village and thus increases its attractiveness. These results imply that general city planning regulations have failed to control the FSD of urban villages.

At the citywide scale, urban village's FSD decreases exponentially as distance from the city centre increases (Figure 5.4). This factor alone explains about 60% of the variation in the built intensity of urban villages. The negative exponential statistical form has been widely used as an analytical tool for the population distance-decay gradient (see for example Clark, 1951; Newling, 1969; Bunting et al., 2002).²¹ Although this research did not directly measure population density of urban villages, assuming that landlords have a good knowledge of local housing demand and vacancy rates are minimal, the form of the distribution of urban village floor space should closely reflect the population density of the migrant population. The built intensity of urban villages, which are spatially systematic, infers that the population density of urban villages across the city will most probably follow a similar form.

²¹ The growth of mixed-use nodes in outer parts of the city complicates city structure. Since the 1970s, the negative exponential statistical form of the density gradient has been superseded by the polynomial and other more complex nonlinear models (Anderson, 1985, Bunting et al., 2002).

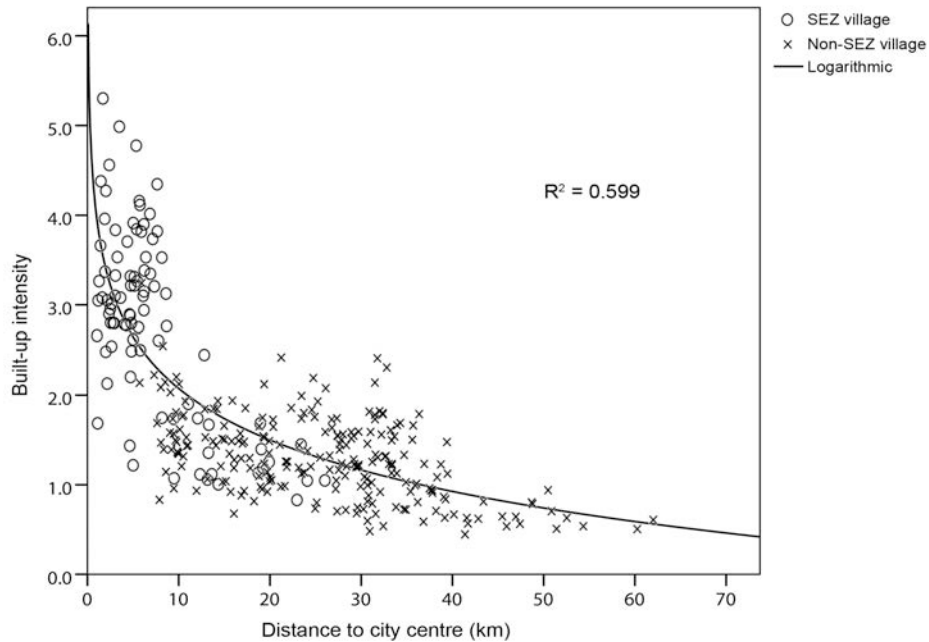


Figure 5.4 Correlation between the built intensity of urban villages and distance to the city centre (the nearest one of the three city centres: Luohu Centre, Futian Centre and Nanshan Centre). The regression line shown is an indicator of the logarithmic relationship in the absence of all the other predictor variables.

5.5 Conclusions

The villages studied existed long before the age of rapid industrial and urban development in China. As Shenzhen was established and started to industrialize and urbanize, the landscape around these villages has changed dramatically. The city's development has triggered their social and physical evolution. These villages are now dramatically different from what they used to be but, owing to the diversity of development across the city, their development is not uniform. In this study, the centre-periphery gradient paradigm explains a large part of the physical development of urban villages, that is further refined with variations due to local development levels and both institutional and natural constraints.

The lack of demographic data prevents a direct measurement of population density in urban villages. However, based on the assumption that there is a very quick response to housing demand, a low vacancy rate, and little variation in

floor space per person, the floor space density is considered a suitable proxy for population density. The rich and fine-resolution data at the building level has allowed us to analyse the complete population of urban villages in Shenzhen to reveal the nature of their development and identify the most important drivers of this development.

Significant supplementary drivers for higher FSD in the SEZ's urban villages are: proximity to metro stops or industrial parks; being smaller in size; and having less overlap with ecological protection zones. For the outer districts FSD is driven by: proximity to the SEZ; proximity to the Guangzhou–Shenzhen expressway; being larger in size; and overlapping with water protection zones. For both areas, having more industries, tertiary activities, or more construction projects in surrounding areas are factors that attract migrants and stimulate housing development in urban villages, while the ratio of non-residential use negatively correlates with built intensity. Natural constraints are of little importance and general urban development regulations are fairly ineffective in controlling urban village development.

The statistical correlations revealed and their policy implications are almost certainly not limited to Shenzhen. Urban villages not only provide affordable migrant housing, they also provide good accessibility to jobs either in the immediate surroundings or via public transport. Therefore, for the livelihood of rural migrants, the location of urban villages is as important as the housing stock provided by these villages. Urban villages are a substantial component of the low-income housing market in many Chinese cities. These cities should consider whether and how intervention strategies could include responses that would avoid the mass demolition and relocation of such important sources of low-income housing, which simultaneously provide the livelihoods of landless villagers. The upgrading of villages or the adoption of a more proactive response by providing planning and design advice to the committees of those villages that are in the initial stages of their development could be avenues worthy of further exploration.

Notwithstanding the positive role of urban villages in housing rural migrants, the results of this study also imply that, in the absence of effective institutional control, indigenous urban village residents tend to maximize their profits from room rental. Their actions of construction and renting are therefore guided by the desire to optimize space use and income through rental: to get the best possible outcome for their property value. The general trend towards rental space maximization inevitably leads to problems like unsafe buildings, a crowded built environment, poor infrastructure, and associated social problems. Where market forces undermine general urban development regulations, enforcing building codes is critical to ensure proper construction, the provision of adequate infrastructure and the creation of an appropriate balance between

private space and public space necessary for roads, open space, schools, etc. It is of great importance for planners to provide professional guidance on preferred development options and to gain control of over-development in order to improve the liveability of the villages.

Finally, an interesting question beyond the scope of this research is what will happen to urban villages next? Studies have suggested that in the short term the evolution of urban villages will be sustained and that government-led redevelopment programmes will face considerable barriers. However, the nature of the urban village determines that even for the most intensively developed urban villages, the rental revenue is still dramatically less than what is achievable with formal high-rise development. As the city further develops and infrastructure improves, the economic rent will rise even more. For landlords and the government, to preserve urban villages in central urban areas would mean a very high opportunity cost. For those villages, therefore, market-led redevelopments are almost inevitable in the medium term. These processes, which have already started, will restructure the housing pattern and drive the low-income population from the urban core. Whether these processes can echo the Municipal Government's ambitious goal—to restructure Shenzhen from a labour-intensive manufacturing city to an intellectual-intensive world city—will challenge the authorities not only in terms of maintaining economic prosperity and sectoral upgrading, but also in promoting an equitable society. The large-scale relocation of low-income households is not without impact unless similar housing can be found nearby without significantly raising transport costs. Given Shenzhen's current size and scale and the plans for its further development, these impacts may not be trivial and can conceivably become barriers to both individual well-being and social stability.

6

THE LAND USE DIVERSITY OF URBAN VILLAGES

Hao, P., Geertman, S., Hooimeijer, P. and Sliuzas, R. (2012) The land use diversity of urban villages in Shenzhen. *Environment and Planning A*, (accepted).

Abstract: Dynamic urbanization in China during the reform period has led to the proliferation of so-called urban villages in many cities. The development of urban villages, based on a self-help approach by indigenous villagers, has been catering for the demand for low-cost housing and for various other social and economic activities. Consequently, urban villages are characterized by growing numbers of buildings, as well as a mix of different functions, including residential, industrial, commercial, and public services. These uses enable different activities in urban villages, assimilating the migrants into the city by providing an alternative niche for working and living. Variations in the land use diversity in Shenzhen are analysed using data from 2009 for more than 333,000 buildings in 318 urban villages across the city. Four statistical models, including three based on a spatial regimes analysis, are used to explain their variation in land use. The results reveal that the land use pattern of an urban village is linked to its location in the urban fabric, its phase of development, and the surrounding level of urban development. Different patterns are apparent inside and outside the Special Economic Zone of Shenzhen, suggesting that the current uniform redevelopment policy for urban villages may not be appropriate.

6.1 Introduction

Dynamic urbanization in China during the reform period has led to the emergence and proliferation of so-called urban villages (*chengzhongcun*) in many cities. Urban villages are created when agricultural land is acquired by the local government for urban expansion and the built-up component of the rural village remains untouched in order to avoid costly compensation and relocation

programmes. These urban villages are spatially enclosed by formally planned and developed urban built-up areas, which are designed for urban functions and lifestyles. Due to the massive influx of migrants who are excluded from the formal urban housing market (Wu, 2004b), urban villages become popular migrant enclaves as they provide affordable and accessible housing units (Song et al., 2008; Wu et al., 2010). In the meantime, non-residential buildings are also developed: numerous industries, commercial facilities and various public services, all of which help to transform urban villages into multifunctional neighbourhoods. The urban village is thus characterized by the co-existence of multiple land use types, though the multifunctionality of the urban village receives relatively little attention in research.

Most of the literature treats urban villages as functionally homogeneous and has tended to focus on their role in housing provision. From this perspective, recent studies have provided interesting insights. Zhang et al. (2003) explained that in the absence of government help urban villages are able to accommodate migrants because the rural status of the indigenous villagers makes them entitled to free land for housing, while the administrative status of the villages largely protects the supply and price of the housing rental market from the intervention of urban planning and development control regulations. Song et al. (2008) found that urban villages are an affordable and realistic housing market for rural migrants who are shunned by the formal urban housing market. Other work has focused on institutional aspects, such as property rights, political and administrative transformation, and government policies associated with urban villages (Tian, 2008; Chung, 2009; Liu et al., 2010; Hao et al., 2011).

Several recent papers have explored aspects of the daily lives of urban villagers, depicting various activities that occur in urban villages. For example, Wang et al. (2009) described the development of commercial activities and the existence of industries in urban villages in Shenzhen as an important economic sector for the village economy. Liu et al. (2010) and Bach (2010) mentioned that many sorts of commercial and social facilities are typically provided in urban villages, including shops, clinics, schools and clubs for the elderly. The mix of land use enables multiple activities, which provide migrants with basic living necessities, services and another important source of job opportunities. Nevertheless, in some cases, the mix of incompatible land uses (residential and industrial, for instance) may directly impact upon the quality of the living conditions through pollution, noise and traffic congestion (Zhu and Hu, 2009; Hao et al., 2010). However, it is clearly an issue with multiple perspectives, with both positive and negative connotations for the residents and for the city. The formulation of effective spatial policies related to land use planning, urban renewal and village redevelopment for example, are hampered by a lack of knowledge of the multifunctionality of urban villages. A thorough analysis of the land use diversity of urban villages is a first step in drafting such policies.

The present study was conducted in Shenzhen, an extremely dynamic megacity in South China. The city comprises two distinctive administrative divisions: a Special Economic Zone (SEZ), functioning as the commercial and political centre; and a non-SEZ area, characterized by extensive industrial and residential development. Urban villages proliferate in both regions but exhibit different characteristics in terms of development phase and local urban context. They also face different policy environments, which exert different impacts on their development.

This paper presents theoretical and empirical analyses of the land use evolution of urban villages and explores the forces that influence the resulting land use diversity across all urban villages in Shenzhen. The analyses are based on several sessions of field work undertaken by the authors in the period 2006–2009 and make use of the detailed Municipal Building Survey data for Shenzhen in 2009. After first discussing the multifunctionality of urban villages in the following section, the land use diversity of urban villages is then measured and mapped in Section 6.3. Thereafter, the paper seeks to explain why different urban villages have high or low land use diversity, using empirical models for Shenzhen (Section 6.4). The final section suggests policy implications and recommends future research topics related to multifunctionality.

6.2 Theoretical Perspective

There have been extensive studies conducted in the past on urban multifunctionality, including the early pioneering work of Jacobs (1961) on promoting multifunctional cities, and more recent research on multifunctional land use (Batty et al., 2004; Rodenburg and Nijkamp, 2004) and its significance for various concepts, such as Compact City (Burton, 2000; Dieleman and Wegener, 2004) and Smart Growth (Vreeker et al., 2004). The multifunctional land use of urban villages shares some similarities with the general applications of the term in urban land use. However, the emergence and evolution of multifunctional land use in urban villages are also linked to the peculiarity of China's land institutions.

6.2.1 Urban multifunctionality

The city is the result of the agglomeration of human activities. Through economic necessity, socio-cultural development and safety considerations, many activities are clustered close together. The mix of urban functions dramatically enhances the efficiency with which labour, products and knowledge are exchanged and utilized. Since the early twentieth century in the

US and Western Europe, many planning policies have reinforced the trend of spatial separation of urban functions. Industries have moved away from traditional urban cores through policies such as environmental protection, new towns and growth poles. Single-use zoning regulation has dedicated large tracts of land to the same type of development and roads or other barriers often segregate commercial, residential, and industrial areas from one another. Consequently, places where people live, work, shop, or spend their leisure time are situated in different parts of the city, extending the distance and duration of travel (Duany et al., 2001). In the 1960s, Jacobs (1961) criticized low density and decentralized urban form and the idea that cities should again promote higher densities, with mostly mixed rather than segregated uses, now appears to be gaining momentum. More recent debates about sustainable urban development toward the end of the twentieth century, such as Compact City and Smart Growth movements, have stimulated a re-examination of principles of urban form, density and land use. Many cities in Europe and around the world already realize that further sprawl results in social, economic, and environmental issues, or is quite simply no longer physically possible (Van den Dobbelaars and de Wilde, 2004). Nevertheless, modern cities in the West are segregated to a much greater degree in terms of their urban functions compared to their earlier presence prior to the twentieth century.

In China, from the early 1990s, planning concepts such as single-use zoning, new town development and vehicle-based transportation became the major doctrines for urban planning. Chinese land-use planning follows a strategy of increased spatial and functional specialization, which is contrary to the earlier, more generalized forms (Friedmann, 2005). Gaubatz (1999) divided the spatial and functional specialization in urban China into three categories: reorganization of the city around multiple business and service centres; increased district specialization; and the establishment of large-scale development zones. Such national trends in urban development are produced through the processes of comprehensive urban planning, spatial expansion of cities, and renewal of existing urban areas. Under such circumstances, the urban village is a by-product of China's urban planning and rapid urban expansion.

6.2.2 Multifunctional land use in urban villages

The urban village is institutionally outside the urban planning and land management system and its land use therefore may differ from general planning and development trends. The indigenous villagers of urban villages develop their land to cater for their own needs in terms of living and livelihoods. Their construction is based on a self-help approach, which is hardly controlled by planning regulations or building codes. Therefore, land use developments in urban villages enjoy much more freedom than in formal urban areas. This

enables the indigenous villagers to profit from their land's prime urban location. Housing units are developed for rent and various other facilities such as supermarkets, schools and factories are also developed, thereby creating a multifunctional land use pattern.

The emergence of urban villages is rooted in China's dual land system. In this system, urban land is owned by the state and rights to use it can be acquired by paying land use rights fees. However, rural land is allocated by the state to farmers and village committees free of charge. In villages, land is further classified into two types: individual-family-controlled land for housing, referred to as *zhaijidi*; and collectively-owned and managed communal land for streets, public facilities, and premises used for businesses. When agricultural land is acquired by the city government for formal development, besides compensating the expropriation, the government usually leaves some spare land to the villagers. This increases the area of communal land, allowing villagers to retain proper infrastructure and enabling them to develop collective economic activities that can partly solve the unemployment problem created by the loss of agricultural land (Wang et al., 2009).

In Guangzhou for example, 8–12% of the total requisitioned land was reserved for the self-development of secondary and tertiary industries (Lin et al., 2011). In Shenzhen, since the 1980s, similar policies were implemented, and in 1993 the municipal government began to standardize land allocation for villages. Under this policy, apart from retaining land for family housing, each village was also allowed to maintain some land for other collective purposes. A maximum of 100 m² of land per registered indigenous resident could be maintained for industrial and commercial uses and 200 m² of land per household could be maintained for roads, infrastructure, open space, culture, health, sanitation, sport and recreation and other public uses (Shenzhen Municipal Government, 1993). Although the amount of land left to villages varied, reflecting historical land use and local circumstances (Wang et al., 2009), and the land use regulations were not often strictly followed (Zhao and Webster, 2011), in general at the initial stage the collectively-controlled land was roughly proportional to the areal size of the village. On this communal land, village collectives can build industrial or commercial buildings for lease, but are not allowed to sell the land or use it for residential development (Zhao and Webster, 2011). It is then the development of non-residential facilities on the communal land that leads to the land use mix in urban villages. These communal lands may be later on acquired by the local government for formal urban development.

6.2.3 Evolution of the functional structure

In the process of physical and socioeconomic transformation of rural villages to urban villages, the functional structures of the villages evolve, catering for the demands of the local population and the requirements of urban institutions. In general, three phases in this process can be identified: an initial phase in which the village starts to deviate from its rural social and spatial pattern; a transition phase in which the urbanizing village becomes a migrant enclave and develops multiple functions; and a mature phase in which the urban village gradually loses its non-residential land uses due to the encroachment of formal urban development.

Traditional rural village societies in China are family-based and largely self-sufficient in terms of how they conduct their activities, i.e. living, working, and social amenities. Most villagers are farmers who work in the fields and obtain services based on their own family's needs (Figure 6.1: a). Dedicated public facilities such as kindergartens, supermarkets, or factories, which are common in cities, are rare in rural villages. As a result, the land use in rural villages is dominated by dwelling buildings, showing little diversity in functionality.

During the transformation process from rural to urban villages, village enterprises are established to promote village industries as an alternative livelihood given the loss of farmland (Smart and Smart, 2001). However, the villagers soon find that property rental (i.e. constructing industrial buildings for lease) to be more profitable than conducting industrial activities by themselves. Many therefore shift to the property development business, relying on developing dedicated, low-cost industrial space to attract investors and make profit. In the meantime, the population of migrant tenants dramatically increases and greatly exceeds the indigenous population. Consequently, a greater demand for commercial and service facilities is generated. For instance, the daily lives of the residents begin to require more personal and professional services, such as shops, hair salons and clinics; their children need to be taken care of in kindergartens and schools. Catering for such markets has enabled the development of various commercial and service facilities to flourish. Cheap products and services in the villages meet the local demand and may even attract customers from outside the villages. As migrant housing, employment and services all develop, the villages become a niche location for the migrants to enjoy an 'urban life'. These developments thus result in the great land use diversity of these urban villages (Figure 6.1: b).

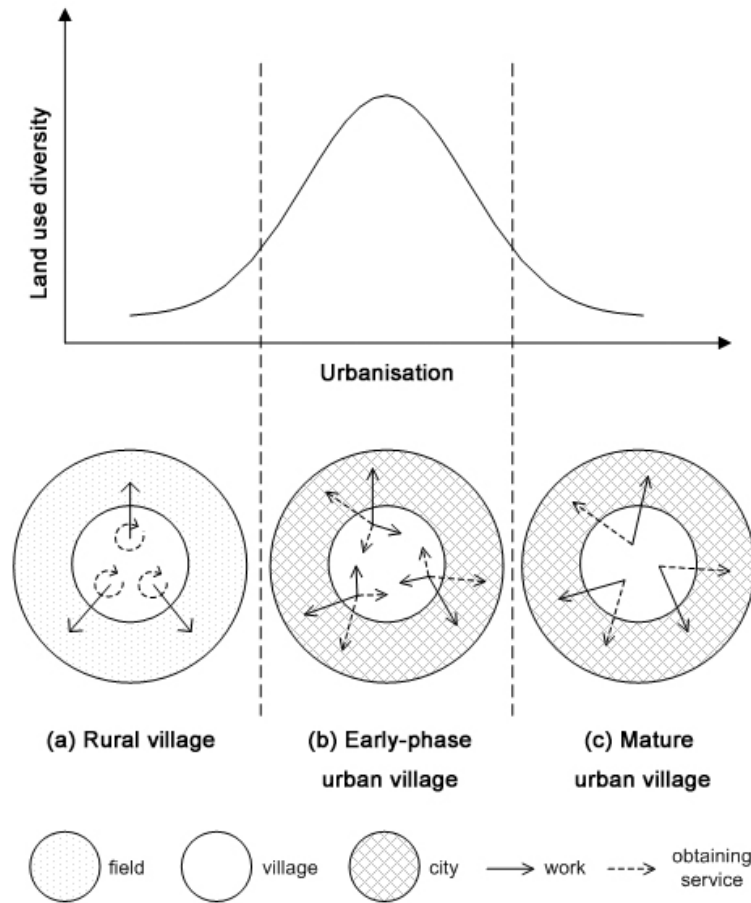


Figure 6.1 Development of the urban village and its land use diversity.

A good example of urban villages at this phase is Nanling—once a poor agricultural village but now an affluent industrial village (Figure 6.2: a). Since the late 1980s, external investment, mostly from Hong Kong, Taiwan and Japan, were mingled with a great influx of migrant workers, creating a strong industrial economy featured by toy and electronics manufacturing. The 4.1 km² village has a fairly small and stable indigenous population of about 800. However, the migrant population reached 56,000 in 2000. The majority of these migrants worked in one of the village's more than 60 industrial enterprises. In 2005, the village collective economy gained a gross revenue of 230 million RMB, most of which were generated from their communal land and collective properties. This

collective economy provides every indigenous villager with an income (besides the rents of their private dwellings), medical care, pension, schooling and a scholarship for those who pursue college education. Nanling's success aroused much attention from the media and the central government.²² Since the early 2000s, however, rising costs drove many industrial enterprises to close down or leave, and some 20,000 migrants left Nanling between 2000 and 2007. This was later exacerbated by the global financial crisis and the resulting shrinking global market. The village responded, with much of its accumulated capital, initiated a shift to cultural industry and a promotion of silk products and jewellery processing. By 2009, the village land use was characterized by multi-storey dwelling buildings on *zhaijidi* and various facilities on communal land: factories, supermarkets, schools, hospital, museum, and a 5-star hotel developed solely by the village collective. With housing, employment and services provided, the village is almost a self-sufficient modern town, with some links to the global market.

However, as the environment of urban villages develops, there are two underlying processes that together shape the further land use change of the urban villages. The first process has been previously discussed by Wang et al. (2009): as urban villages evolve, and their urban contexts develop, the condition for the urban villages to develop certain functions changes. For instance, industrial development could be driven away from villages in central locations because of the high economic and institutional costs for industrial production. On the contrary, villages in suburban areas would become more attractive over time, as land is relatively more abundant in these areas and transport and other infrastructures are improving. Similarly, the development of commercial activities and public services would also change, in order to meet local demand and to suit the local conditions for development. These changes lead to an adjustment of the land use structure of urban villages over time. Meanwhile, the surrounding areas of urban villages also become commercially well established and provide increasing numbers of jobs and services. This is also in accordance with an increase in the educational level of migrant tenants. Thus, village residents become less reliant on the jobs and services inside the villages, and consequently the multifunctionality of their village is likely to decrease (Figure 6.1: c).

²² As a showcase of successful village development, Nanling was formally visited by both president Hu Jintao and his predecessor Jiang Zemin.

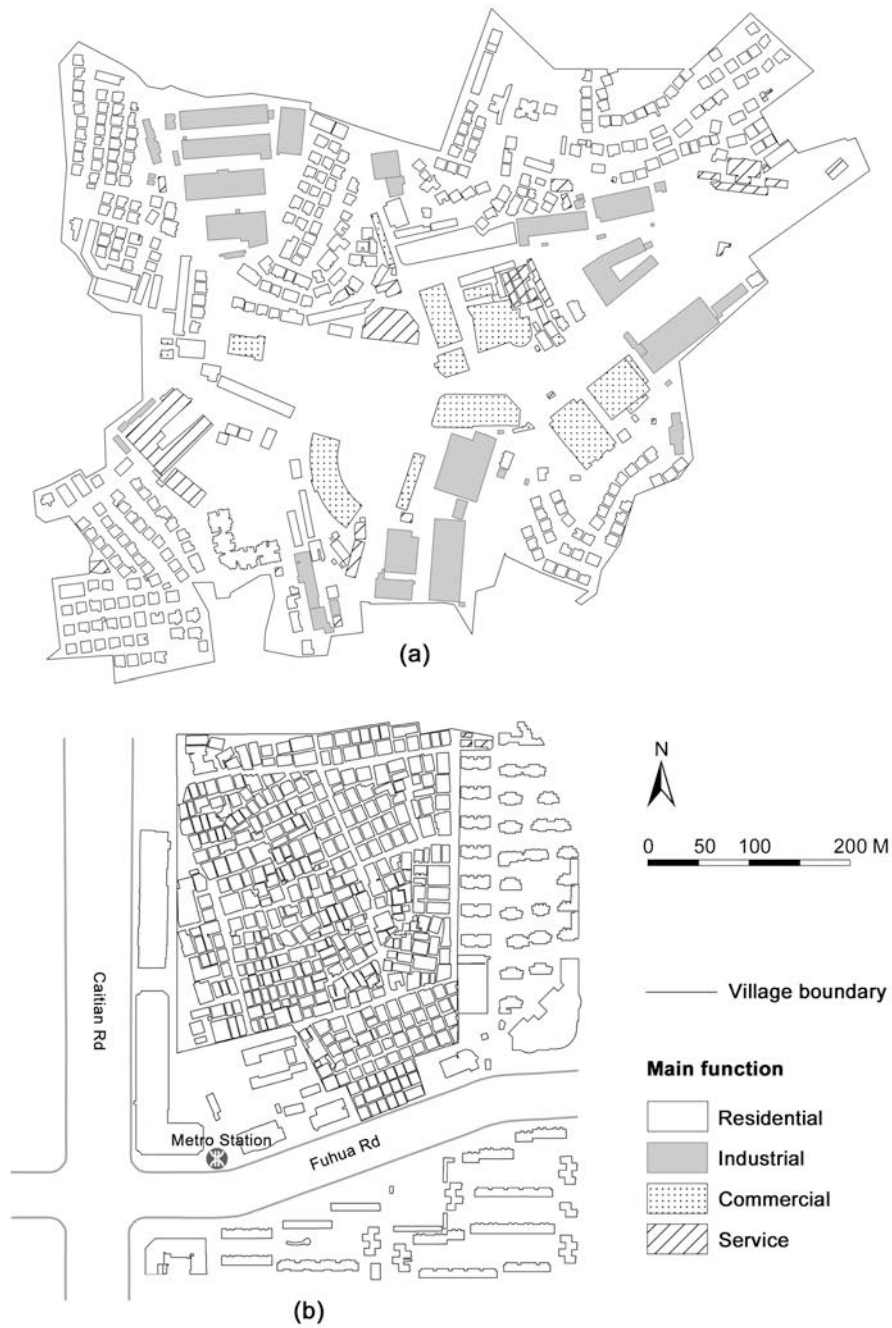


Figure 6.2 Land use pattern of two urban villages, 2009: (a) Nanling village central section; (b) Gangxia village eastern section.

The second process is that over time development in the formal urban areas requires more land; both market-driven and government-led redevelopment start to encroach on urban village land. In this process, the redeveloped area is subtracted from the village land and converted to state-owned urban land. Such redevelopment is usually carried out through a combination of both administrative and market forces. When faced with such encroachment, villagers are more inclined to relinquish their communal land than their *zhaijidi* because of three reasons: first, most of the indigenous villagers rely on their *zhaijidi* and private properties for their own accommodation, and as the most important source of revenue generation (Hao et al., 2011); second, the property rights over the collectively-owned properties are not clearly defined, and thus indigenous villagers feel less secure over their communal land compared to their *zhaijidi*; and third, the cost of redeveloping the communal part of the village is considerably less because the compensation standard is lower (Zhao and Webster, 2011) and quite often the village committee or shareholding company can make decisions on behalf of the collective, negating the need to negotiate with numerous village families. These three reasons will lead to a decrease in the non-residential part of the villages and consequently a radical decline in land use diversity.

Urban villages that have gone through these two processes to reach a mature phase can be well demonstrated by Gangxia (Figure 6.2: b), which once was a small agricultural village just to the north of Hong Kong border. In the past 30 years, the environs of the village have changed dramatically, from paddy fields to industrial parks and later to Shenzhen's central business district. In 2008, Gangxia's indigenous population of about 900 possessed more than 500 dwelling buildings on a mere 0.23 km². These buildings accommodated 100,000 migrants (Hin and Xin, 2011) and included prosperous commercial activities on the ground floor. However, almost all its communal land has been acquired for formal development. As a result, unlike Nanling, most of the migrant tenants work in the formal city, and village revenues are mostly generated from private dwellings. Although the indigenous villagers of Gangxia, as individual landlords, are very rich, their village collective entities are economically and politically powerless. This leads to a rather loose social cohesion, which weakened their negotiation ability when facing redevelopment pressure from the government. The western section (Heyuan) of Gangia was demolished in 2010 and is being redeveloped into shopping malls and high-rise office and apartment buildings, leaving the eastern section (Louyuan) untouched but only for now.

The two processes—a spontaneous local development and a constant impact from the surrounding formal city—simultaneously exert influences upon land use change in the urban villages. However, for different urban villages in different development phases, or in different locations, one of the two processes

is likely to play a more important role. In Shenzhen, given the distinctive characteristics of the SEZ, such a difference is found between the SEZ and the non-SEZ districts. Urban villages in the SEZ are in a more advanced phase (e.g. Gangxia). Their surrounding urban context is more economically established and intensively developed, providing sufficient jobs and services, and thus the urban villages have less need to develop multiple functions themselves. Typically their tenants also tend to have attained a higher level of education and acquired jobs in the formal urban sectors (Hao et al., 2011). Moreover, as municipal policies are more focused on redeveloping the SEZ villages, they are likely to have experienced more extensive redevelopment and land requisition. Consequently, SEZ urban villages are likely to have less non-residential land use and relatively low land use diversity. In the non-SEZ districts, which were integrated into Shenzhen in 1993, urban villages are in an earlier development phase (e.g. Nanling). Urban encroachment is less common and the provision of jobs and services are more sufficient in the villages. Consequently, urban villages located outside the SEZ are generally in the process of market-driven land use development and have been impacted less by redevelopment.

The multifunctional development of urban villages shares some common features with other forms of informal settlements around the world. Demand from a rising migrant population drives a high density of housing development and the development of various functions. Commercial and public facilities and small-scale manufacturing are also found in, for instance, slums in India (Nijman, 2010) and favelas in Brazil (Garmany, 2009). However, the dichotomy of private residential land (*zhaijidi*) and communal land is unique to urban villages. Possession of communal land enables and secures a large proportion of land for communal economic development. Thus large-scale properties can be developed for industrial or commercial activities. Such activities provide large amounts of employment within the villages, rather than just providing housing for those who work in the formal city as often is the case in other contexts (Turner, 1968; Van Lindert, 1991).

It should be noted that the process of land use change is not confined to urban villages. The growth and decline of manufacturing in urban villages is a part of a larger economic transition path experienced by Chinese cities in the post-reform era. The decentralization of economic decision-making arouses local initiatives and individual production enthusiasm (Lin, 2001). City development has benefited from the influx of investment and labourers as well as the dramatic globalization of production and finance based upon foreign investment in labour-intensive and export-oriented manufacturing and large quantities of cheap labour and land (Sit and Yang, 1997). Large-scale international enterprises were attracted by formal industrial parks initiated by municipal governments while small investments were largely dealt with at the village level, where social and cultural ties between investors and the local community

facilitated quick and successful deals. However, the recent decade has witnessed a substantial weakening of manufacturing competitiveness. Great pressure from continually rising production costs and competition from outside of other cities encourages industrial restructuring and economic upgrading. Many enterprises shift from inner city to the outskirts and to inland cities, where land and labour costs are cheaper. Manufacturing in urban villages are also subject to this general economic restructuring process.

6.3 Land Use Diversity of Urban Villages in Shenzhen

According to the aforementioned evolution process of urban villages, at a certain point in time, urban villages across the city should exhibit different land use structures based on their location in the urban fabric, their development phase, and the development of their surroundings. An exploration of the land use pattern of urban villages across the city could indicate the relationships between land use diversity and the factors that may impact upon the land use change of the urban villages. Besides, a degree of land use specialization of urban villages is also likely to occur, resulting in different distribution patterns for different functions. The remainder of this paper will explore such spatial patterns by analysing urban village data from Shenzhen.

6.3.1 Study area and data

The city of Shenzhen was established in 1979 in order to develop an export-oriented economy that could benefit from its proximity to Hong Kong. In 1980, the Shenzhen SEZ was established as an experiment to attract foreign capital, technology and management skills, making it the first city in socialist China to experience the operation of a market economy. Thereafter, the astonishing development of the city has led to its population growth from around less than half a million to fourteen million in just three decades. The study area covers the whole city of Shenzhen, including the 410 km² SEZ (comprising the four districts of Luohu, Futian, Yantian and Nanshan), and the 1559 km² non-SEZ area (comprising Baoan and Longgang districts, covering 714 km² and 845 km² respectively) (Figure 6.3).

Shenzhen has been transformed from an agriculture-based rural society into an industrial-based modern city. Agriculture, which made up 37% of its GDP in 1979, contributed less than 0.1% in 2008. Spatial expansion of formal urban development has swallowed the rural hinterland, leading to the creation of 318 urban villages (Figure 6.4), which accommodate an estimated seven million residents comprising indigenous villagers and migrant tenants (Zacharias and Tang, 2010). These urban villages have also accommodated a large proportion

of the manufacturing sector and employment. The emergence and development of urban villages in Shenzhen is tightly linked to the city's development, economic restructuring and social transition. As the city grows in terms of population size and built-up area, the increasing number of urban villages and their physical and socioeconomic transformation significantly increase the city's overall capacity to provide space for housing, industrial production and services.



Figure 6.3 Administrative divisions and analysis unit (Source: SUPB).

The Shenzhen Municipal Building Survey 2009, commissioned by the Shenzhen Urban Planning Bureau (SUPB), provides building-level information for all the buildings in Shenzhen, including those in the urban villages. Attributes including building name, address, ownership, main function, footprint area, storey, and floor space are available for each building. There are in total 615,702 buildings, 333,576 (54%) of which are in urban villages and owned by indigenous villagers or their collectives. These urban village buildings comprise 314,709 (94%) private dwelling houses. The rest of the buildings in the urban villages were classified into three major types: industrial buildings (6,683); commercial facilities (5,154); and public services (7,030), adopting a broad functional classification used by Batty et al. (2004) in studying the multifunctionality of European cities. Some buildings in the urban villages have multiple functions but are recorded as being monofunctional. For instance, multi-storey private dwelling houses along main village roads often use their

ground floors for commercial use, but they appear in the data only as a dwelling. As the building survey data only indicate the main function of each building, we could not analyse the functional diversity at the finest level. As a consequence the commercial use is likely to have been underestimated for most of the villages.

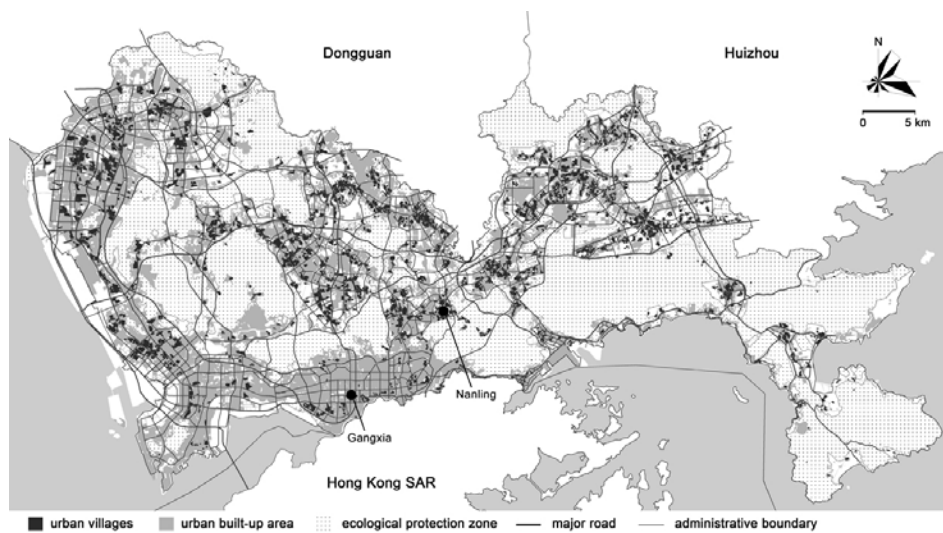


Figure 6.4 Urban villages in Shenzhen and the city landscape (Source: SUPB).

Contextual data used to explain the land use diversity of urban villages were provided by the SUPB and the Urban Planning and Design Institute of Shenzhen (UPDIS). These data include urban village boundaries, administrative boundaries, road network information, and the locations of city centres²³ and major industrial parks. Physical land use information of urban villages in 2004 from an urban village survey by the UPDIS was also used for the analyses. The 2004 survey data only cover the residential components of the urban villages; however, it allows the general growth trend of each urban village in the 2004–2009 period to be examined by comparing the land use patterns of the settlement part between the two years.

²³ Shenzhen, as a polycentric city, has three major city centres: Futian Centre, Luohu Centre and Nanshan Centre (see Figure 6.3).

For the purpose of visualization, the city was divided into continuous analysis units according to administrative divisions. In Baoan and Longgang districts, former administrative village boundaries were used as a standard to integrate data. In the SEZ, as a result of intensive urban development, the administrative village boundaries are no longer used. Instead, the *jiedao*, an administrative division similar to wards in Western cities, was used for the SEZ districts. The statistics for the 89 urban villages inside the SEZ districts were aggregated to 30 *jiedao* areas prior to the analyses being made. The final result was that the city was divided into 261 analysis units, 30 *jiedao* areas in the SEZ, and 231 administrative villages outside the SEZ. The city's 318 urban villages are found in 255 of the 261 analysis units (Figure 6.4). For the regression analysis described later, we did not aggregate the village data and thus had 318 observations.

6.3.2 Measurements of land use diversity

The land use mix of an urban village can be generally indicated by three variables: the number of types of land use (richness); the amount of each land use (abundance); and the proportion of the land use in the mix (evenness). To measure the land use diversity, we took into account both the richness of land use and the evenness of different land use, which is a universal concept used for developing biodiversity indices (Magurran, 1988). Moreover, the land use intensity was also considered by calculating the building floor space of each land use. By summing the floor areas of the buildings for each use, the total floor area of each function could be calculated to provide a more accurate functional structure of the village.

This study employs two empirical measurements to indicate the functional pattern of urban villages. First, the Shannon index (H), derived from entropy maximization, quantifies the diversity of functions based on two components: the number of functions and their proportional distribution, i.e. richness and evenness, respectively. The Shannon index is calculated by adding for each function the proportion of each function multiplied by the natural logarithm of that proportion; that is, $H = -\sum p_i \ln p_i$, where p_i is the proportion of the urban village's total floor space found in function i . The maximum value of the Shannon index is reached when all four functions are available and all the functions have the same proportion of total floor space.

In addition to the measurement of the overall diversity level of each urban village, we were also interested in the specialization of urban villages, as well as the variation of the specialization across different villages. To this end, Location Quotient (LQ) (Isserman, 1977), based on the abundance of each land use, was adopted to compare an urban village's share of a particular function with the

reference urban village's share of the same function. This helps to identify the villages, which experience significantly higher or lower development of certain functions than the average level for all villages. According to the LQ of each analysis unit per function, LQ maps were produced for the four main functions: residential, industrial, commercial, and public services.

6.3.3 Functional patterns of land use

Overall, all urban villages in Shenzhen are, as expected, dominated by residential function (Table 6.1). The proportions of residential floor space in total floor space range from 64.9% to 99.9% across all urban villages. The proportions of industrial and commercial functions show larger variance across villages. It is likely that industrial and commercial activities are more pronounced in some villages than others because of the development preference of these sectors and the agglomeration effect. However, as a sufficient amount of public service provision is necessary for almost every urban village to serve the local village population, the public services should be more evenly distributed across urban villages.

Table 6.1 Descriptive statistics of the proportions of floor space of major functions in urban villages in Shenzhen, 2009 (N=255).

Function	Minimum	Maximum	Median	Mean	SD	Moran's <i>I</i> (<i>p</i> -value)
Residential	64.9%	99.9%	93.9%	92.8%	0.056	-0.04 (0.116)
Industrial	0%	25.2%	2.0%	3.4%	0.041	0.32 (0.001)
Commercial	0%	31.7%	1.6%	2.3%	0.031	0.23 (0.002)
Public services	0%	12.5%	1.1%	1.5%	0.015	0.07 (0.052)
Shannon entropy	0.012	0.953	0.276	0.292	0.163	0.29 (0.001)

Spatial autocorrelation analysis shows that industrial and commercial developments are spatially clustered while residential and public services are not.²⁴ This indicates that urban villages that are specialized in industrial or commercial developments are distributed close to each other. These villages are

²⁴ Queen contiguity weight was used to define the spatial weight matrix for spatial autocorrelation analysis.

likely to possess a comparative advantage for developing industrial or commercial sectors, which is probably because they benefit from better accessible locations or positive influences from the formal urban development in their surroundings.

Due to the availability of the four land use types and different spatial distributions, the entropy values for the villages vary significantly, ranging from 0.012 to 0.953. While most of the villages show low levels of diversity due to the dominance of residential function, some villages exhibit high diversity levels. The diversity levels of urban villages are also spatially clustered at the city scale, as revealed by the spatial autocorrelation test. From the entropy map of urban villages (Figure 6.5), the low diversity villages are found in both the most central and developed area (Futian district) and the most peripheral areas (northwest of Baoan and Dapeng Peninsular in the east of Longgang). Urban villages having high diversity values are mainly found in the middle zone of the city. This is in line with the hypothetical land use evolution model introduced previously (Section 6.2.3, Figure 6.1).

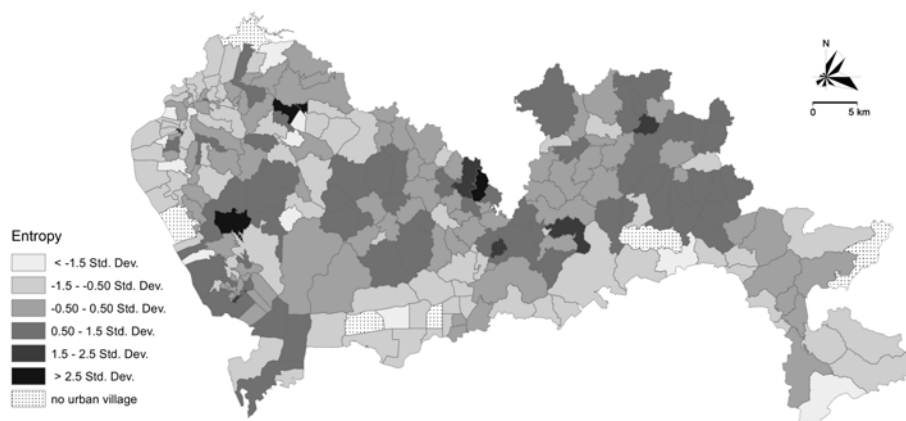


Figure 6.5 Entropy map of functional diversity of urban villages in Shenzhen.

Figure 6.6 shows the LQs for the four main functions. As the dominant function, the distribution of residential function is relatively even across villages and the LQs show small variance across urban villages. However, the highest concentration of the residential function is found in places including the most developed urban areas in the SEZ and the least developed urban areas in the periphery of Baoan and Dapeng Peninsular. Most low LQ villages are in the

transition zone between the city centre and the periphery. The overall pattern is characterized by a homogeneous city centre and peripheral villages separated by a more heterogeneous middle zone.

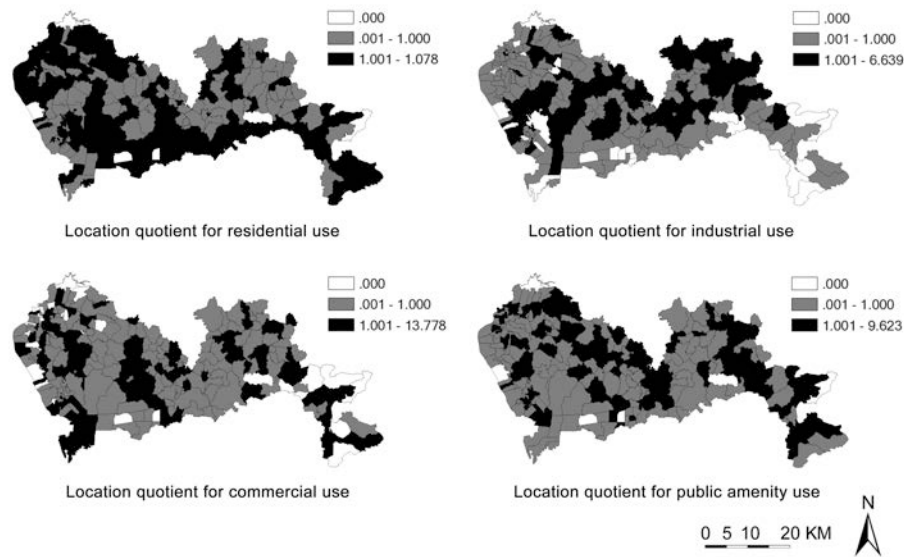


Figure 6.6 Location quotients in urban villages for the four major functions.

The industrial LQs show larger variation across urban villages. Urban villages with high industrial development are mainly concentrated in the transition zone between the city centre and the periphery. By contrast, both the SEZ and the peripheral areas (northwest of Baoan and east of Longgang) have few urban villages with industrial development higher than average. At the city scale, the distribution pattern of the LQs for industries also shows a pattern characterized by a homogeneous city centre and periphery separated by a more heterogeneous middle zone. Moreover, with few exceptions, it is clear that the concentrations of industrial development are mostly located in the areas where residential function is less dominant.

The variation of the commercial LQ is even larger, but high LQ villages are fewer. Consequently, urban villages with high commercial development are more scattered in distribution. Such urban villages are found in places that include more developed areas, such as the Luohu Centre and most parts of

Nanshan district in the SEZ, as well as the least developed areas, such as the eastern part of Longgang.

Urban villages with high levels of development of public services mostly appear outside the SEZ, both in the areas close to the SEZ and the city periphery. They are very scattered in distribution and have a distribution pattern in which high LQ villages are surrounded by low LQ neighbours, which is perhaps because some of the high LQ villages are functioning as service centres beyond their own boundaries. Moreover, urban villages with high levels of public services are seldom located in the activity centres, such as the city centres or district centres, where public services are sufficiently developed in the formal urban areas.

The land use of urban villages in Shenzhen exhibits functional diversity and their diversity levels vary across urban villages. For different functions, different spatial distribution patterns have been detected. While the residential and public service functions are more evenly distributed over the urban villages, the industrial and commercial functions are more intensively developed in specific locations. These patterns suggest that the functional structure of an urban village is likely to be related to its location in the urban fabric, as well as the land use development in the formal urban areas in its surroundings. The factors which determine these patterns are examined next.

6.4 Explaining the Level of Land Use Diversity

We have seen that the land use diversity of urban villages is pronounced at the city scale. To explore the drivers behind this land use diversity, we started with an ordinary least square (OLS) regression to test the role of different factors in shaping the land use structure of urban villages. The dependent variable was the log-transformed Shannon entropy value of each urban village,²⁵ which indicated a village's land use diversity level.

The model included seven independent variables (Table 6.2) that were expected to be related to the land use diversity of urban villages in three aspects: the location of the urban village in the urban fabric; the development characteristics of the village; and the development pattern in the village's urban environment.

²⁵ Natural logarithm transformation was applied to the Shannon entropy value of urban village since the data distribution was positively skewed.

Table 6.2 Description of independent variables.

Variables	Data transformation	Description
CENTRE	Ln	Average road distance to nearest city centre among Futian Centre, Luohu Centre and Nanshan Centre from each urban village building
MROAD	Ln	Average Euclidean distance to nearest major road from each urban village building
INDPARK	Ln	Average road distance to nearest industrial park from each urban village building
SIZE	Ln	Areal size of urban village in 2009
INTENSITY	Ln	Floor area ratio of urban village's residential components in 2009
INTRATE	—	Intensification rate of urban village's residential components in 2004–2009
ENV_INT	Ln	Floor area ratio of formal urban area in urban village's surrounding environment in 2009

Three proximity variables were used to indicate the location of the urban village. These were: road distance to city centre (CENTRE);²⁶ Euclidean distance to nearest major city road (MROAD); and road distance to nearest industrial park (INDPARK). In order to accurately calculate the three distance variables, the location of each building of the urban village was used and from these the mean value for all buildings in each urban village was derived.

The city centre represents the concentration of employment, markets, and various services. CENTRE is closely related to access to markets and vibrant socioeconomic activities. It was expected that the proximity to the city centre should positively influence the land use diversity of urban villages. MROAD indicates the accessibility to the road network, which is important for land use development, especially for industrial and commercial development.

²⁶ Road distance to nearest city centre among Futian Centre, Luohu Centre and Nanshan Centre.

Consequently, a positive effect of the proximity to major road was also expected. Industrial parks are presumably more monofunctional than other urban areas. However, these parks are concentrated with a huge amount of migrant workers, who generate great demand for various functions. These demands will drive the nearby urban villages to develop multiple functions. Consequently, INDPARK was expected to relate negatively to high land use diversity in urban villages.

Three independent variables were related to the land use characteristics of the urban village: the land area in 2009 (SIZE); the average floor area ratio of the residential components in 2009 (INTENSITY); and the growth rate of the floor area ratio of the residential components in the most recent five-year period, 2004–2009 (INTRATE). SIZE was expected to positively influence the land use diversity, as bigger villages have the advantage in developing multiple functions. It was also expected to be related to redevelopment and land acquisition because these lead to an immediate reduction in land area. INTENSITY, measured by floor area ratio, reflects the village's development phase. The higher the intensity of the village, the later its phase of development, indicating the village may have experienced more extensive land acquisition and redevelopment. As a result, land use diversity was expected to be negatively related to the built intensity. INTRATE indicates the development speed of the village's residential part in the recent past, which in itself indicates the magnitude of land use development in the village. Consequently, it was expected to positively influence the land use diversity.

One independent variable (ENV_INT) was used to indicate the land use intensity in the urban village's environment. This variable measures the floor area ratio in the surrounding formal urban areas in the same administrative division (administrative village boundary for the non-SEZ and *jiedao* for the SEZ). High development intensity implies more intensive land use in the village's urban context, which was expected to positively influence the land use diversity of urban villages. However, higher intensity in the village's surroundings also indicates high land use pressure in these areas and thus a greater chance of urban encroachment on urban villages. As a result, the effects could be different for different urban regions.

To achieve a normal distribution of independent variables, six variables were log-transformed before modelling (Table 6.2). Multicollinearity was not found: variance inflation factors were estimated for all independent variables and were found to be less than 2.85, with a mean value of 1.76, well below the value 10 that is usually regarded as problematic (Kennedy, 2008).

As discussed in Section 6.2, there are two underlying processes that together shape the land use diversity: land use development driven by market demand;

and the encroachment on urban village land by redevelopment. Both processes are closely related to the independent variables. For instance, being close to the city centre may lead to higher diversity because of vibrant economic activities; however it may also lead to a greater chance of redevelopment, reducing land use diversity. Although both processes are concurrent, it was expected that for different villages at different phases of development, or in different geographic locations, one of the processes was more dominant than the other. In Shenzhen, it was expected that SEZ urban villages will differ considerably from those in the non-SEZ area. By 2009, urban villages in the SEZ were generally in a more advanced development phase, and have experienced more extensive redevelopment in the recent past. By contrast, urban villages in the non-SEZ were generally in an earlier phase of development, and have experienced less or no redevelopment in the recent past. Given these different contexts, it is reasonable to expect that the nature of the observed association between explanatory variables and the land use diversity of urban villages may differ between the SEZ and the non-SEZ.

Consequently, for different urban villages the effect of explanatory variables might be conditioned or moderated. The assumption that the same causal processes operate throughout all urban villages, an assumption that is implicit in non-spatial OLS analysis, is therefore probably invalid. In such cases, the heterogeneity of the effect of independent variables is likely to cause biases in coefficient estimates. In order to consider the heterogeneity of the effect of independent variables, the spatial regimes model (Anselin, 1990) was employed. This uses a disaggregated modelling strategy by estimating separate models for pre-defined spatial regimes. The spatial regimes model allows the covariates and the residual covariance to vary across regions (SEZ versus non-SEZ). In essence, separate coefficients are estimated for the two regimes: a 'market regime' (non-SEZ), in which land use development is more spontaneous and determined by the market demand for various activities; and a 'planned regime' (SEZ), where formal urban development has encroached on urban villages and led to a direct loss of land use diversity. The spatial regimes model is similar to estimating a separate model for each region, but with two advantages: first, it estimates the standard errors within each regime based on the whole dataset, which results in more precise standard error estimates; and second, a spatial Chow test evaluates whether the coefficients between regimes are significantly different.

In both the OLS model and the spatial regimes model, the residuals for possible spatial effects were examined to determine the necessity of implementing a spatial regression model. To test for spatial dependence in a multivariate regression context, diagnostic tests were used to determine whether spatial

autocorrelations were present in the residuals.²⁷ As the Moran's *I* tests of the residuals of the OLS model and the spatial regimes model revealed spatial autocorrelation, spatial regression models were tested, which took the form of a spatial lag model and a spatial error model. The spatial lag model implies that the geographic clustering of high land use diversity is due to the influence of multifunctionality in one urban village on the multifunctionality in another. This model is consistent with a kind of diffusion process. The spatial error model implies that clustering reflects the influence of unmeasured variables.

The final results included four models (Table 6.3): an OLS model (Model I); a spatial regimes model (Model II); a spatial regimes model with spatial lag estimation (Model III); and a spatial regimes model with spatial error estimation (Model IV). For Model I, the R^2 is reported. For each of the other models, a pseudo R^2 is reported.²⁸ Since the proper measures for goodness-of-fit for the spatial regimes model are based on the likelihood function, the value of the maximized log likelihood is reported to allow comparison with those achieved for the standard regression model, while the pseudo R^2 is not (Anselin, 1992).

The spatial regimes consideration significantly improves the log likelihood from -419.44 to -387.15. The heterogeneity of the effect of independent variables between the two regimes was detected by the Chow-Wald test. The null hypothesis of coefficient stability was clearly rejected, suggesting that the effects were not stable across regions. Moreover, an examination of the tests of individual coefficients revealed that several of the explanatory variables exhibit significantly different effects between the SEZ and non-SEZ. These results give credence to the hypothesis that different causal processes operate across urban villages. The spatial lag and spatial error models further improve the model, with a respectively significant spatial lag term and significant lambda detected. The effects of other explanatory variables were consistent with those observed in non-spatial analyses.

²⁷ To define spatial weight matrix, a distance of 10 km between urban village centroids was used to define neighbours.

²⁸ The pseudo R^2 is the ratio of the variance of the predicted values over the variance of the observed values for the dependent variable.

Table 6.3 OLS, spatial regime, spatial-lag and spatial error models for functional diversity of urban villages in Shenzhen.

	Model I: OLS	Model II: Spatial regime model		
		SEZ	Non-SEZ	Stability of coefficients
CONSTANT	-2.262 (-1.660)*	-1.631 (-0.737)	3.550 (1.811)*	3.069* [0.081]
CENTRE	-0.266 (-2.735)***	-0.488 (-2.798)***	-0.535 (-3.811)***	0.044 [0.835]
MROAD	-0.125 (-1.498)	0.109 (0.778)	-0.132 (-1.394)	2.030 [0.155]
INDPARK	-0.061 (-0.695)	-0.363 (-2.395)**	-0.115 (-1.077)	1.795 [0.181]
SIZE	0.377 (7.374)***	0.657 (6.973)***	0.172 (2.894)**	18.921*** [0.000]
INTENSITY	-1.003 (-5.999)***	-1.491 (-5.132)***	-0.677 (-3.408)***	5.354** [0.021]
INTRATE	0.385 (2.240)**	-2.442 (-2.095)**	0.205 (1.162)	5.042** [0.025]
ENV_INT	0.132 (0.995)	-0.572 (-2.414)**	0.147 (0.960)	6.497** [0.011]
SPATIAL LAG	—	—	—	—
LAMBDA	—	—	—	—
Sum. Statistics:				
N	318		318	
R^2 / Pseudo R^2	0.337		0.459	
Log likelihood	-419.437		-387.146	
Moran's I	0.067 (6.774)***		0.008 (1.943)*	
Chow-Wald	—		8.500 [0.000]	

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed tests), t -value (Model I) or z -value (Model II, III, IV and Moran's I) in parentheses, p -value in brackets.

Table 6.3 (continued).

Model III: Spatial lag-estimation			Model IV: Spatial error-estimation		
SEZ	Non-SEZ	Stability of coefficients	SEZ	Non-SEZ	Stability of coefficients
-1.558 (-0.727)	3.644 (1.919)*	3.307* [0.069]	-3.006 (-1.345)	4.603 (1.930)*	5.418** [0.020]
-0.415 (-2.421)**	-0.510 (-3.745)***	0.189 [0.663]	-0.309 (-1.738)*	-0.641 (-3.348)***	1.611 [0.204]
0.093 (0.685)	-0.125 (-1.373)	1.783 [0.182]	0.073 (0.541)	-0.124 (-1.365)	1.462 [0.227]
-0.368 (-2.512)**	-0.084 (-0.818)	2.502 [0.114]	-0.343 (-2.380)**	-0.072 (-0.690)	2.324 [0.127]
0.655 (7.181)***	0.154 (2.676)***	21.513*** [0.000]	0.634 (6.986)***	0.144 (2.411)**	20.329*** [0.000]
-1.410 (-4.965)***	-0.630 (-3.271)***	5.218** [0.022]	-1.459 (-4.977)***	-0.648 (-3.261)***	5.233** [0.022]
-2.620 (-2.318)**	0.214 (1.256)	6.149** [0.013]	-2.722 (-2.443)**	0.231 (1.347)	6.859*** [0.009]
-0.395 (-1.634)*	0.131 (0.883)	3.409* [0.065]	-0.390 (-1.623)*	0.118 (0.782)	3.207* [0.073]
0.279 (2.068)**				—	
—				0.311 (1.683)*	
	318			318	
	0.465			0.528	
	-385.131			-385.205	
	—			—	
	59.230 [0.000]			63.214 [0.000]	

Comparing the OLS model to the spatial regimes model, besides the improvement of model fit, there were interesting changes in signs, magnitudes and significance of explanatory variables. According to the Chow-Wald test, there was a significant statistical difference between the SEZ and the non-SEZ for the model overall. Moreover, the coefficients for SIZE, INTENSITY, INTRATE, and ENV_INT vary significantly across regions. The effects of MROAD, INTRATE and ENV_INT work completely differently in the two regimes as shown by the change of sign for the coefficients. The signs of other variables were unchanged but had quite different magnitudes, especially for the village size and built intensity of the village's residential part. The constant terms for the two regimes were also significantly different, implying obvious structural heterogeneity between the SEZ and the non-SEZ.

The areal size of the urban village was positively related to land use diversity for both regimes. This positive effect was expected because bigger villages have advantages in developing multiple functions. Abundant land resources are important for developing dedicated facilities, especially industrial buildings: a bigger village implies stronger political and economic power of the village collective; and a bigger village is also more likely to establish a self-sufficient neighbourhood. All these aspects contribute to greater land use diversity. However, between villages in the SEZ and those in the non-SEZ, the magnitude of the effect was significantly different. The much larger impact in the SEZ implies that redevelopment processes, which include land acquisition leading to an immediate drop in land use diversity, play an important role in determining the current land use pattern. However, in the non-SEZ, this effect was less evident because large-scale land acquisition has not yet taken place.

The proximity to the city centre positively influences land use diversity. Locations close to the centre were more economically vibrant and thus urban villages in those locations attracted a larger variety of development. Away from the centre, urban villages do not readily establish a diverse land use structure. Being closer to the centre also increases the chance of redevelopment; however, such effects do not exhibit significant differences between the two regimes.

The proximity to an industrial park was positively related to land use diversity throughout the city. This positive relationship is due to the fact that industrial parks are monofunctional but attract migrant workers who generate demand for multiple functions in the neighbouring villages. This effect was not significant in the non-SEZ because these industrial parks usually provide their own living compounds and other service facilities for workers inside the parks, reducing the demand for such services in the nearby urban villages.

The built intensity of the residential part of the urban village reflects the development phase of the urban village. Villages in the later phases of

development have a greater built intensity and were also more likely to have experienced redevelopment. Consequently, these villages have a lower proportion of non-residential land use and lower land use diversity. The negative effect was stronger in the SEZ because redevelopment is more advanced there.

In the SEZ, the built intensity of the urban village's environment was negatively related to the land use diversity, while in the non-SEZ, the effect was positive. In the SEZ, a greater built intensity reflects greater development pressure and land value. Property development in such locations is thus more profitable and villages found there are more likely to face redevelopment offers from the government and/or private development companies. Where redevelopment does occur it generally first targets the collectively-owned village lands that tend to be used for non-residential purposes, followed in some cases by the individually-owned lands that require more numerous negotiations for compensation. Consequently, SEZ urban villages located in more intensively developed urban areas tend to have a lower proportion of non-residential land and lower land use diversity than those found elsewhere. However, outside the SEZ, a greater built intensity indicates a more active level of development in the surroundings, and therefore a positive influence on the land use diversity of the village.

Similarly, urban villages in the SEZ that have recently experienced rapid intensification on their residential land tend to have lower land use diversity. In many cases, they have sold their collective land through a second round of public land acquisition, providing a new source of capital for further residential construction and intensification. Thus, less land is used for non-residential functions and the land use diversity is lower. However, in the non-SEZ area, housing development is positively related to land use diversity as a result of market-driven land use development and less redevelopment.

The proximity to major roads was not significant, but an opposite effect was detected for the two regimes. The negative effect in the SEZ reflects the higher frequency of redevelopment in places close to major roads inside the SEZ. The effect was positive in the non-SEZ districts because redevelopment was much less there and proximity to a major road is an advantage for villages to develop multiple functions. It is likely that the two effects, which are concurrent in each regime, may cancel each other out and result in insignificant coefficient estimation.

The significant spatial lag term suggests the possibility of diffusion. Villages that successfully develop multiple functions would influence their neighbouring villages through the diffusion of entrepreneurship, experience and investment, leading to similar multifunctional development in the neighbouring villages.

Meanwhile, the significant lambda supports another interpretation, suggesting the existence of other unmeasured factors that cause spatial clustering. These factors may be related to some cultural or socioeconomic characteristics, or the local policy environment shared by villages that are close to one another. However, even though such spatial dependence is considered, the models explain about half of the variance in land use diversity of urban villages. Each urban village's local culture, socioeconomic status, collective collaboration and leadership, networking and the ability to attract investment²⁹ are other important factors that contribute to the shaping of its land use structure. Some of these factors, especially those that are rooted in historical legacy, are intangible and difficult to directly observe or measure. However, these factors almost certainly play an important role in the land use development of urban villages and deserve further research.

6.5 Conclusions

This study has found that urban villages in Shenzhen exhibit great land use diversity, suggesting that the view that urban villages are primarily migrant enclaves is not valid. Multiple economic and social functions have developed on the collective village land, which was initially proportional to the village size. However, as the urban villages are diverse in terms of location, development phase and the level of surrounding development, their land use patterns also vary greatly. The statistical analysis of variables that are correlated to the level of land use diversity in urban villages revealed significant differences between the SEZ and non-SEZ villages. This reflects the dominant role played by large-scale land acquisition and redevelopment in the SEZ, which significantly reduces the proportion of non-residential land use. Formalized urban redevelopment programmes are leading to a reduction in the land use diversity of centrally located villages, while more peripheral villages are experiencing a rise in land use diversity. These trends will definitely have an influence on the overall land use development of the city.

Although the proposed general development model presented in Section 6.2.3 suggests that over time all villages will go through the three stages—from monofunctional, to multifunctional, and then back to monofunctional—this is likely to be faster and more complete in the SEZ than it will be outside the SEZ. In the latter area somewhat different forces are at play and the size and aggregate scale of development is such that property investment could, in general, be less intense. Moreover, the speed with which any specific village

²⁹ Extensive networks with relatives who are overseas Chinese are an important source of investment for urban villages (Bach, 2010).

moves along the development path will vary according to its location in the city and its distinctive characteristics. Also, it is conceivable that some villages may never get to the final stage, as policies may change and villages themselves may start to redevelop autonomously, emulating formal redevelopment processes but retaining control and profits while driving the cost of compensation for formal redevelopment to a prohibitively high level.

The urban villages' unregulated growth generates space for rental housing and service provision similar to informal settlements elsewhere. However, as indigenous villagers form a clan-based society, with shared cultural and historical values and much social and economic cooperation, a high level of social cohesion is formed, enhancing their ability to develop a strong local economy. Moreover, the urban villages' communal land ownership enables the establishment of large-scale and dedicated industrial clusters, which not only facilitate advanced industrial production for a global market but also generate an enormous amount of jobs. In recent years, due to rising production costs and a stagnant global market, both municipal governments and village communities are forced to upgrade their economies, from labour-intensive manufacturing to high-tech and cultural industries. At the municipality level, Shenzhen's economic restructuring programme targets all manufacturing industries, including those in urban villages. At the same time, village committees and their collective companies are investing their resources to upgrade their local economies. These challenges will definitely influence the future land use change of Shenzhen and its urban villages.

Meanwhile, in many cities urban villages are threatened by urban renewal policies. In 2005–2009 a redevelopment for 137 urban villages was introduced in Shenzhen. In neighbouring Guangzhou, 52 urban villages are on a redevelopment list (Guangzhou Municipal Government, 2009). These villages are clearly integral parts of the spatial economy; they are not just historical anachronisms, oddities or hermetic low-income rental housing enclaves. In Shenzhen and many other cities they are part of the intrinsic structure of the urban land, labour and capital markets. Redevelopment means more than removing a few hundred thousand low quality homes. In the situation where rural migrants are discriminated in both the urban labour market (Wang and Wu, 2010) and the housing system (Wu, 2004b), the niche places where they work, consume, and obtain services will also be impacted. Cities that implement such large-scale redevelopment programmes may face not only a shortage of low-cost housing, but also a dramatic decrease in the provision of accessible employment and services in the redevelopment areas. The loss of these three will drive the migrants away from these areas, and perhaps even from the city as a whole, thereby structurally changing the city's socioeconomic profile and possibly substantially disrupting the labour market for unskilled and low-skilled workers.

Several authors have suggested that planning strategies should be broadened to avoid mass demolition and relocation (Zhang, 2005; Song et al., 2008; Hao et al., 2011). The lack of standard regulations, professional guidance on development options, and enforcement measures for developments in urban villages are reasons for many of the problems found in urban villages today, including over-development and chaotic land use with its associated environmental degradation issues. In the situation where market forces undermine development regulations, enforcing building regulations in urban villages is critical to ensure proper land use and clean and safe living conditions. A potentially interesting option could be to investigate whether municipal planners can provide professional guidance on preferred development options for specific villages in order to improve the environmental quality, land use synergy and liveability. To this end, village upgrading or providing planning and design advice to the villages are proper options that would reflect a positive and proactive approach to urban village development.

To explore such avenues requires understanding of the urban village phenomenon beyond its migrant housing function. This paper represents a first attempt to provide a solid base for further inquiry into the multifunctionality of urban villages. However, much remains to be done. Future work should be devoted to explaining the specialization of urban villages and examining the impact of redevelopment programmes on different urban villages and different types of land use. As the Municipal Building Survey data are expected to be regularly updated from 2009 on, temporal data on physical and functional changes of buildings will hopefully allow for longitudinal studies to be carried out on the land use evolution of urban villages. Moreover, analyses of socioeconomic and institutional conditions should be combined with analyses of physical development and land use composition. Consequently, factors that influence the land use development of urban villages can be examined in more detail and the various impacts of urban village policies can be more fully assessed and evaluated.

SYNTHESIS

Based on:

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7.1 Introduction

The urban village, as a new urban form, emerged in large numbers only after China's economic reforms of the late 1970s. In many cities, urban villages physically grow and vary functionally in such ways that enable an increasing housing stock as well as a variety of socioeconomic activities. The spatial evolution of urban villages, although having mostly occurred in the last decade, represents a very large share of urban growth and significantly shapes the cities' residential profiles. Urban planning and management should therefore recognize the important roles that urban villages play within contemporary Chinese urban development.

In Shenzhen, the spatial evolution of urban villages is a manifestation of a profound historical process, whose primary driver has been the explosive growth of migrants. Temporal changes in the distribution of the city's vast migrant population reflect the opportunities for cheap housing and employment across the city. This study has examined this process in Shenzhen, where urban villages emerged earlier and are more numerous than most other Chinese cities.

This final chapter summarises the main findings of this study, provides policy implications, and discusses the limitations of this study and suggests future research topics.

7.2 Spatial evolution of urban villages

Theoretical and empirical analyses were carried out to understand the spatial evolution of urban villages in Shenzhen, where rapid urban expansion since

1979 has created 320 urban villages³⁰ spread over the entire city. These urban villages provide rooms for half of the city's population and their growth in the most recent decade represents a very large share of the overall urban growth. Because of their large number and wide distribution, it was possible to observe and compare their different development trajectories, and learn more about the role of locational factors in their development. Moreover, a relatively long study time from 1999 to 2009 allowed different phases of urban village development to be readily examined. Based on fieldwork and using building-level data of all 320 urban villages, this study has revealed that the growth of urban villages exhibits spatial and functional diversity that is to an extent driven by the planned development of the formal city.

Four aspects of the spatial evolution have been explored in order to answer the four original research questions: First, the growth and change of urban villages were investigated in order to understand how they emerge and develop in terms of their physical environment and socioeconomic status over time and space. Second, the development phases and patterns of urban villages were identified and explained. Third, the driving forces of the development of urban villages were revealed and the spatial variation in urban village development explained. Fourth, the land use diversity of urban villages was explored to understand the process of, and reason for, their functional change. The results of these analyses are summarized in the subsequent four sub-sections. Based on these findings, sub-section 7.2.5 discusses future development trends of urban villages.

7.2.1 Urban village growth

As Shenzhen grows in terms of population size and built-up area, the increasing number of urban villages and their physical and socioeconomic evolution significantly increase the city's overall capacity of housing and service provision. Meanwhile, the development of urban villages in Shenzhen is tightly linked to the city's overall development, economic restructuring and social transition, and therefore to the local variations in these aspects as well. Although urban villages tend to share some common features, they are also diverse in many ways, reflecting to a degree the diversity in their environs. In the meantime, the growth of urban villages in turn shapes Shenzhen's urban landscape and housing market. The urban village, as a major type of residential land use, is well integrated into the city's housing market as a more or less perfect substitute for formal commodity housing. Moreover, the physical and socioeconomic evolution of urban villages was found in this study to be a result

³⁰ The number reduced to 318 in 2009 due to complete redevelopment of two urban villages.

of the natural and logical response of the indigenous village population and rural migrants in facing rapid economic development and social transition.

However, together with the perceived environmental and social problems associated with urban villages, the increasing shortage of land for future development faced by Shenzhen drives the government to redevelop many urban villages. The recent practice of such redevelopment programmes indicates that there are considerable barriers to be overcome before these programmes can be rolled out at the scale envisaged, and even then many more villages will remain unaffected. Moreover, as the city still lacks a scheme for affordable housing provision, when redevelopment does happen, there are both social and economic risks triggered by the displacement of large numbers of migrants besides a housing shortage. The potential shortage of cheap rental housing is likely to exclude many of the low-income earners in certain areas or even the city as a whole. Consequently, the reduced social inclusiveness of the city could weaken Shenzhen's economic competitiveness while increasing the potential for social problems, such as homelessness and crime, and societal instability.

7.2.2 Development phases and patterns

Urban villages in Shenzhen have been evolving rapidly throughout the most recent decades. This evolution process is characterized by three distinct but overlapping phases: expansion by increasing land area, densification through infilling, and intensification through increasing the height of buildings. These phases represent a very rational strategy for villagers to first maximize their land holdings at minimal cost and then use the accrued rents to finance more capital-intensive high-rise development. The growth of urban villages, in the forms of these phases, has been continuously producing large quantities of low-cost housing units for the migrant population.

At the citywide spatial scale, the speed and scale of an urban village's development are related to its location in the urban fabric, as development conditions and constraints vary over space. Initially the development of urban villages in the outer districts lagged behind that of those in the SEZ, but they follow the same development path and have since been catching up rapidly. Moreover, the development of urban villages tends to be clustered and village development manifests itself as a spillover effect from inside to outside the SEZ. These patterns imply the spatial clustering of the growth of the migrant population and the possible diffusion of migrant employment from the SEZ to outer districts. Besides, the government's redevelopment programmes target a group of urban villages that are actually more popular and successful in the housing market, as reflected by very high built intensities in the more centrally

located villages. Consequently, both the indigenous villagers and migrant tenants of those villages strongly resist the redevelopment programmes, leading to a very slow progress of their implementation.

7.2.3 Driving forces

Access to employment, along with development constraints, are important determinants for urban village development, but there are different forces at play in the two main parts of the city. For the SEZ, the proximity to metro stops or industrial parks, being smaller in size, and having less overlap with ecological protection zones are factors associated with a high built intensity. For the outer districts, proximity to the SEZ or the Guangzhou–Shenzhen expressway, being larger in size, and overlapping with water protection zones are factors that are associated with a high built intensity. For both areas, having more industries, tertiary activities, or more construction projects in surrounding areas are factors that attract migrants and stimulate housing development in urban villages, while the ratio of non-residential use negatively correlates with built intensity. The slope of the land in urban villages imposes a mild negative impact. Besides, general urban development regulations are fairly ineffective in controlling urban village development.

The centre-periphery gradient paradigm is a useful model to explain much of the physical development of urban villages, though variations remain due to local development and institutional and natural constraints. Based on the assumptions that housing construction responds quickly to housing demand, and that a low vacancy rate and little variation in floor space per person exist, the built intensity of urban villages can be seen as a useful proxy for population density. Given these assumptions, the distribution of the migrant population follows a pattern of distance decay away from the city centre, which is the general pattern of population distribution in a mono-centric city.

7.2.4 Land use change

The evolution of urban villages is also associated with the growth and decline of multiple economic and social land use functions, reflecting the changing local demand and conditions for the development of different land uses, as well as the competitive pressure from formal urban development in their environs. Rural villages usually have low land use diversity and, as they start to urbanize and transform into urban villages, their land use diversity rises significantly as collectively-owned industries and services are developed. Further development of these urban villages towards a mature phase leads again to a decline of land use diversity as collectively-owned land is acquired for formal urban development projects planned by the municipal authorities. Consequently, at the

city scale, variation in land use diversity is explained by each urban village's location in the urban fabric, its phase of development, and the surrounding level of urban development. The different patterns apparent inside and outside the SEZ reflect the dominant role that is played by large-scale land acquisition and redevelopment in the SEZ. Formalized urban redevelopment programmes are leading to a reduction in the land use diversity of centrally-located villages, while more peripheral villages experience a rise in land use diversity. These trends will definitely have an influence on the overall land use development of the city.

The pattern of land use across urban villages also suggests the possibility of diffusion: villages that successfully develop multiple functions may influence their neighbouring villages through the diffusion of entrepreneurship, experience and investment, leading to similar multifunctional development in the neighbouring villages. This spatial pattern could also result from the effect of other unmeasured factors related to cultural or socioeconomic characteristics, or it could be a reflection of the local policy environment shared by villages that are close to one another. Besides, an urban village's local culture, socioeconomic status, collective collaboration and leadership, networking and the ability to attract investment are other important factors that possibly contribute to the shaping of its land use structure. Some of these factors, especially those that are rooted in historical legacy, are intangible and difficult to directly observe or measure. However, these factors almost certainly play an important role in the land use change of urban villages.

7.2.5 Future trends

Severe competition in the land development market has been reshaping the urban landscape in Shenzhen and other Chinese cities. Land leasing and development take place on an enormous scale, including those places in the vicinity of urban villages. Driven by market demand, land use efficiency has been improved significantly in those areas. However, because landlords within urban villages cannot transfer their property rights to private developers, land values in urban villages are usually substantially lower than those of neighbouring formal urban areas. Property development by indigenous villagers, although comprised largely by unauthorized constructions and modifications, is the only possible means to exploit the potential land value. To capture the increasing market value of their properties, further increases in the density and intensity of land use should be anticipated.

Over time villages are expected to experience the sequential and overlapping development phases of expansion, densification and intensification, and go through the three stages—from monofunctional, to multifunctional, and then

back to monofunctional. These processes are likely to be faster and more complete in the SEZ than it will be outside the SEZ. In the latter area somewhat different forces are at play and the size and aggregate scale of development is such that property investment could, in general, be less intense. Moreover, the speed with which any specific village moves along the development path will vary according to its location in the city and its distinctive characteristics. It is also conceivable that some villages may never get to the final stage: policies may change and villages themselves may start to redevelop autonomously, creating new urban forms that emulate those created through formal redevelopment processes but retaining control and profits. Such responses might drive the cost of compensation for formal redevelopment to a prohibitively high level.

Together with the perceived environmental and social problems associated with urban villages, the increasing shortage of land for future development faced by Shenzhen drives the government to redevelop many urban villages. In Shenzhen and other cities, government-led redevelopment characterized by demolition and reconstruction has become a most influential factor for the future development of urban villages. Such policies reduce a great deal of urban village housing stock; it results in declining land use diversity; and it pushes the remaining villages to become even more intensely developed. In the meantime, there are both social and economic risks associated with these policies. Moreover, large-scale redevelopment could conceivably lead to large-scale intra-city migration of displaced tenants, promoting new development pressures in the outer districts and the decline of their environmental conditions.

Furthermore, large-scale redevelopment of urban villages is certainly not only about housing. As a result of redevelopment, many other economic activities will often be converted for the high-end property markets. In the situation where rural migrants are discriminated in both the urban labour market (Wang and Wu, 2010) and the housing system (Wu, 2004b), the niche places where they work, consume, and obtain services will also be impacted. Cities that implement large-scale redevelopment programmes may not only face a shortage of low-cost housing, but also a dramatic decrease in the provision of accessible employment and services in the redevelopment areas. The loss of both will drive the migrants away from these areas, and perhaps even from the city as a whole, thereby structurally changing the city's socioeconomic profile.

However, the nature of the urban village—rural land institution and self-help-based development—determines that even for the most intensively developed urban villages, the rental revenue is still dramatically less than what is achievable with formal high-rise development. As the city further develops and infrastructure improves, the economic rent will rise even more. For the urban village landlords and the government, to preserve urban villages in central

urban areas would mean a very high opportunity cost. For many villages, especially those centrally located ones, market-led redevelopments are almost inevitable in the medium term. These processes, which have already started, will restructure the housing pattern and drive the low-income groups from the urban core. Whether these processes can echo the Municipal Government's ambitious goal—to restructure Shenzhen from a labour-intensive manufacturing city to an intellectual-intensive world city—will challenge the authorities in terms of not only maintaining economic prosperity and sectoral upgrading, but also promoting an equitable society. Given the plans for Shenzhen, these impacts may not be trivial for the city as a whole and could become a barrier to both individual well-being and social stability.

7.3 Policy implications

In the short term, the evolution of urban villages will be sustained and government-led redevelopment programmes will continue to take place at large scales and in more cities. As discussed earlier, these developments entail crucial risks and are likely to trigger a series of socioeconomic consequences. In order to provide a more appropriate and sustainable response to these challenges, a number of policy implications of this study are discussed in this section.

7.3.1 Avoiding mass demolition

The urban village not only broadens the range of housing choice, but also provides the opportunity for migrants to use the urban village housing as a haven to settle down in the city and later, as a springboard, to seek better employment and accommodation. Ironically, it is often the most popular and successful villages in the low-income housing market that are selected by the municipality for redevelopment. If these urban villages are in fact redeveloped as the government intends, an important subset of the urban village housing market would vanish. This might result in a severe low-income housing crisis, because the choice of alternative local housing is absent, and moving to other urban villages in a more remote location substantively increases transport and time costs for low-income households.

Urban villages have clearly become integral parts of the spatial economy. They are not historical anachronisms, oddities or hermetic low-income rental housing enclaves. They are, in Shenzhen, part of the intrinsic structure of the city, land, labour and presumably capital markets. The redevelopment of these villages is not only removing a few hundred thousand low-quality homes, but also destroying an important socioeconomic component of the city. Officials in Shenzhen and other Chinese cities would do well to consider whether and how

intervention strategies could be broadened to include responses that would avoid mass demolition. Village upgrading or the adoption of a more proactive response in those villages that are in the initial stages of their development, by providing planning and design advice to the village committees and shareholding companies that might avoid over-development, could be avenues worthy of exploration.

7.3.2 Substitutive housing

It is expected that China's urban growth will continue to accelerate in years to come. A large proportion of the incoming migrants will have to be accommodated by a low-cost housing market. An effective, efficient and growing affordable housing provision in a city is also very important for the functioning of the urban labour market and overall economy. In many cities, low-cost housing provided by urban villages is likely to remain in great demand. However, many of these villages are already over-populated and some of them will be redeveloped in the near future. In most cities, where an alternative housing option for rural migrants is absent, a subsidized housing scheme is needed to accommodate the present and incoming migrant population, including those who are displaced due to redevelopment of urban villages.

Today, the central and local governments have expressed increasing concerns about the livelihood of rural migrants. Providing equitable opportunities and inclusive social welfare for rural migrants is considered as an important task for the creation of a harmonious society. Many cities have proposed plans to build subsidized social housing that is accessible for rural migrants, while some pioneering cities have started to provide low-cost rental housing for rural migrant workers. However, these projects provide only very limited numbers of housing units and the requirements for applying are too high for most migrants. Local governments, who benefit from urban village redevelopment projects, should make larger financial contributions to support low-cost housing provision at a larger scale. Moreover, many of these low-cost rental housing projects are criticized for being far from the urban core, while efficient and cheap connections to public transport are absent. Such housing projects are incapable of replacing urban village housing. From this study, it is worth noting that urban villages not only provide affordable migrant housing, but also good accessibility to jobs either in the immediate surroundings or via public transport. For the livelihood of rural migrants, the location of urban villages is as important as the housing stock provided by these villages. To this end, low-income housing can only function effectively when transport cost can be minimized.

7.3.3 Development control

As demonstrated in this study, the evolution of urban villages works on the just-good-enough principle, rather than a perfecting principle. On the one hand, the urban villages cater for migrants' housing needs in terms of quantity and affordability, implying that the current redevelopment policies are likely to disrupt this niche housing market. On the other hand, left unattended, urban village development often generates far from ideal living environments. Guided by the desire of the landlords to obtain the best possible outcome for their property value, urban villages evolve by maximizing the usage of available land and maximizing the height of buildings, possibly to their limits. Besides, insecure property rights of urban village land tend to induce short-term investments, leading to a sub-optimal utilization of scarce land resources and to various negative externalities. The lack of standard regulations, professional guidance for urban village development options, and enforcement of building codes in urban villages result in many of the physical problems found in urban villages today.

In the situation where market forces undermine general urban development regulations, enforcing building codes in urban villages is critical to ensure proper construction and the provision of adequate infrastructure, as well as the creation of an appropriate balance between private space and public space necessary for roads, open space, schools, etc. It is of great importance for planners to provide professional guidance on preferred development options and to strictly control over-development in order to improve the liveability of the villages. By doing so, the villagers' capital investments may enjoy a longer life span and redevelopment may be postponed or perhaps even become superfluous. To this end, geographic information system (GIS) instruments and existing databases (e.g. citywide building surveys) can be used to identify urban villages that suffer different levels of over-development or infrastructure deficiency and to prioritize urban villages for improvements. Consequently, upgrading or regeneration measures can be specified for individual villages. In practice, urban village policies should consider the local context, development path, and present status of each urban village, and the preparation and implementation of such policies should ideally be in cooperation with the indigenous villagers.

7.3.4 Financial measures

From a financial perspective, it should be acknowledged that the lucrative business of urban village housing takes advantage of public investment in road extensions, metro development, and other improvements of infrastructure and environmental quality, while the residents obtain benefits without making any

financial contributions for the provision of such services. Currently, the government can only share the value-capturing now enjoyed by the indigenous villagers through wholesale land acquisition and redevelopment. However, such redevelopment programmes usually conflict with the landlords' long-term interests, causing considerable barriers for the implementation of those programmes.

The introduction of a financial instrument, such as a property tax on urban village houses, could be an avenue worth exploring as a means to gain additional influence over urban development, including that of urban villages. It would also be a new source of government revenue, thereby reducing the dependency of local government finances on urban expansion and redevelopment. Moreover, this should also increase the land security of urban villages, which will considerably encourage their landlords to invest in housing, the environment and infrastructure improvements (i.e. quality rather than quantity, which in the long run will be more efficient and sustainable). However, this move requires a radical change of the current land institution and new legislation to clarify and protect the property rights of the urban village housing. Moreover, it will require careful thought in design and implementation if it is to be enforceable and effective.

7.4 Contribution to literature and future research

This study provides a comprehensive empirical analysis of the development of urban villages using a systematic approach. It examines the urban village with respect to its spatial context and its position and role in the wider spatial economy. It demonstrates the spatial evolution process of urban villages in terms of their physical growth and functional change, which also proves that the view on urban villages from existing literature as static and uniform migrant enclaves is not valid. The spatial evolution of urban villages and its resulting diversity are explained with respect to the local conditions and constraints of individual villages as well as to the overall urban development process. These analyses provide concrete empirical findings that not only give new insights into the development of urban villages, but also support explorations on other relevant topics associated with migrant housing and livelihood, land use dynamics, informal urban development, and urban spatial development and regeneration.

Owing to the lack of trustworthy demographic data³¹, this study did not directly measure the population density of urban villages. Moreover, there would be far more people who want to live in certain villages than what were measured by floor space. In order to examine the distribution of migrants accurately, demographic data should be analysed. Besides, more detailed studies of the interplay among factors such as the socioeconomic profile of urban villages, their leadership, and the implementations of redevelopment programmes, will also be needed to understand fully the mechanisms determining how urban planning and growth drive urban villages to evolve. To these ends, four major research topics that deserve further exploration are described below.

7.4.1 Spatial dynamics

With our cross-sectional approach it is not possible to fully capture the interactions between the evolution of urban villages and the overall urban growth, because the development of urban villages is determined not only by the present conditions and constraints for development, but also subject to past experience. There is also a time lag for the formal urban development to have an impact on urban villages. Repeating the municipal building survey at regular intervals, along with more empirical data, will enable longitudinal analysis, which may allow interactions between these factors to be determined and reveal how changes in formal urban development influence the built intensity and land use of urban villages over time. Consequently, factors that influence the land use development of urban villages can be examined in more detail and the various impacts of urban village policies can be more fully assessed and evaluated.

7.4.2 Social dynamics

This research focuses on the physical change of urban villages, while the socioeconomic dynamics in those villages is indeed another important dimension of the urban village's evolution. Analyses of social and economic data of urban villages should be combined with the analyses of physical development and land use composition. This could contribute to gaining knowledge on the relationship between urban villages' socioeconomic transformation and their physical change, which certainly interact with each other. Besides, the urban village has never been studied as a significant component of the urban housing market. However, these villages are a major

³¹ There are widespread concerns in the scientific community regarding the quality of some of these population data (Peng, 2011).

subset of a highly dynamic urban housing system. It is critical to have a better understanding about how urban villages and the rest of the housing market shape the residential space in a city and how this residential space enables and constrains people's behaviour according to their social status and during their life course.

7.4.3 Land use specialization

Urban villages are characterized by growing numbers of buildings and the mix of buildings for different land use functions including residential, industrial, commercial, and public services. These uses enable different activities in urban villages, assimilating the migrants into the city by providing an alternative niche place for working and living. This study analysed the overall level of land use diversity of urban villages; however, the specialization of urban villages has not yet been explored. In other words, the reasons for certain villages' specialization in particular sectors of industry, commerce, or services, are as yet unknown. The specialization of an urban village should be related to the endogenous characteristics of each urban village, as well as the local conditions for developing a particular type of economy. This specialization is also expected to relate to a specific development trajectory of the village, which is important for the planning of case-specific urban village programmes.

7.4.4 Planning support

Based on the understanding of the spatial evolution of urban villages and the resulting diversity, the next critical task is to develop methods to support planning associated with urban village development. As more and more new data are collected and stored, information infrastructure for large municipalities like Shenzhen can be built and utilized to facilitate more comprehensive analysis. With more detailed information on urban villages and clear objectives in planning, a methodology in the format of a Planning Support System can be developed to assist decision-making concerning urban villages. Detailed GIS analysis for feasibility assessments of development options for urban villages can be carried out. This may support urban planning in either assessing intended policy choices, or coping with negative impacts due to redevelopment programmes. For the former purpose, village development options could be assessed for villages in their initial stages of development, and upgrading or renewal options could be assessed for villages in more mature stages. For the latter purpose, mitigation measures like the provision of subsidized low-income housing could be assessed, and allocation of those housing units could be optimized.

7.5 Final remarks

As China's urbanization proceeds further and deeper, many urban villages will be redeveloped and others will continue to evolve. In the meantime, new urban villages are in the making, with the expansion of existing cities and the emergence of new cities. This development will continue to transform the landscape of cities and their rural environs, as well as the social lives connected to those places. This study is a first attempt to probe into the spatial evolution of urban villages, which contributes to a better understanding of the overall urban dynamics in the Chinese context. The interaction between planning and urban village dynamics reveals an interesting and complex relationship: macro-level patterns emerge from micro-level processes and behaviours, which are controlled by macro-level constraints. In this process, the spatial evolution of the villages manifests organic growth and high levels of adaptivity that are responsive to their individual surroundings. It is hoped that the findings of this study can provide a solid base for further explorations that can also contribute to better planning support and decision-making.

The urban village, as a unique and unprecedented urban form, is a result of China's hybrid status as a developing country in transition. It indicates a peculiar dichotomy of land institution and a striking gap in China's urban housing policy that ignores rural migrants. It is also a reflection of many growth-related issues in contemporary China: dramatic urban transition and expansion, agricultural land loss, discrimination against rural migrants, urban housing shortage, and a seemingly manic real estate development. As economic growth is a main driving force for urban development, migrant labour is seen more as a means of production than as a social asset. The relatively low social status of migrants contributes to the identity and culture of the city, certainly at least to those parts of it where migrants congregate. For China's future, a balanced, integrated perspective on urban development that also considers the two other pillars of sustainability—social equity and environmental protection—is of much greater importance and urgency than ever before.

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SUMMARY

Since the introduction of economic and social reforms in the late 1970s, China has experienced a huge influx of people into its cities, coupled with massive urban expansion. As a by-product of these processes, urban villages (*chengzhongcun*) have emerged and evolved rapidly to satisfy the increasing demand for low-cost housing and a variety of social and economic activities. In many cities, the spatial growth of urban villages represents a very large share of total urban growth and has significantly shaped the cities' land use patterns and residential profiles. However, in both planning practice and research the urban village phenomenon has often been viewed as a relatively simple, static and homogeneous stereotype of migrant enclaves. Moreover, as the urban village generally has a negative image encompassing many environmental and social problems, urban policies aim foremost at their demolition and redevelopment. This causes large-scale displacement of residents and, if current programmes are maintained, may give rise to a shortage of low-income housing. The development of more sustainable urban village policies calls for and relies upon a thorough understanding of the evolution process of urban villages and their spatial and socioeconomic diversity.

In this research, a theoretical and empirical analysis is carried out in order to understand the spatial evolution of all 320 urban villages in Shenzhen over the period 1999–2009. The research examines the urban villages with respect to their spatial context and their position and role in the wider spatial economy. The spatial evolution process of urban villages is analysed and described in terms of their physical growth and functional change, revealing that a common perception of urban villages from existing literature as static and uniform migrant enclaves is invalid. Using exploratory spatial data analysis, multivariate models, and spatial regimes models, the spatial evolution of urban villages and the resulting diversity are explained with respect to the local developmental conditions and constraints of individual villages, as well as to the overall urban development process.

This research finds that the growth of urban villages is organic and highly adaptive. Their evolution is driven by the planning and development of the formal city and its resulting social and spatial diversity, but is also linked to their location in the urban fabric. Five major issues have been identified. First, the physical and socioeconomic development of urban villages is the natural and logical response of the indigenous village population and the rural migrants in facing rapid economic development and social transition; second, the development process of urban villages follows a general trajectory characterized by three distinct but overlapping phases (expansion, densification and

intensification); third, their growth is spatially clustered though the growth centres shift over time, following the general expansion of urban development and the diffusion of employment; fourth, the development of urban villages is driven by the provision of jobs and accessibility to job locations, but it is also confined by physical and institutional constraints such as diminishing land availability and environmental protection plans; and fifth, the land use of urban villages also evolves and the resulting land use diversity in urban villages reflects different local conditions for economic activities and development. These processes are also found to be faster and more advanced in the central city than in the outer districts. The speed with which any specific village moves along the general development path varies according to its location in the city and its distinctive characteristics.

Urban villages in Shenzhen are expected to further evolve in terms of density, intensity and diversity of land use. Meanwhile, the large-scale government-led redevelopment programmes will continue. However, the recent practice of redevelopment programmes in Shenzhen indicates that there are considerable barriers to be overcome before they can be rolled out at the scale envisaged. Moreover, as the city still lacks a scheme for affordable housing provision, the large-scale redevelopment of urban villages entails both social and economic risks triggered by the displacement of large numbers of migrants. Shenzhen and other Chinese cities that implement such large-scale redevelopment programmes may face not only a shortage of low-cost housing, but also a dramatic decrease in the provision of accessible employment and services in the redevelopment areas. These impacts may not be trivial and could conceivably become a barrier to both individual well-being and social stability. China's contemporary urban planning and management should therefore recognize the important role of urban villages, rethink the current redevelopment policies, and resort to more sustainable planning strategies. Intervention strategies should be broadened to include responses that would avoid mass demolition. Upgrading and regeneration measures, for example, could be specified for individual villages; plus, financial instruments like a property tax on urban village houses could also be explored. Alongside such strategies, affordable housing provision should be broadened to include rural migrants, and the planning of such housing provision should place special emphasis on transport accessibility.

SAMENVATTING

Sinds de invoering van economische en sociale hervormingen aan het einde van de jaren '70, zijn in China grote groepen migranten naar de grotere steden getrokken, hetgeen heeft geleid tot een versnelde urbanisatie. In dit proces van snelle urbane groei zijn zogeheten 'Urban Villages' ('chengzhongcun') ontstaan, kortheidshalve: dorpen ingekapseld door uitdijende steden. Deze 'Urban Villages' voorzien in goedkope huisvesting en in allerlei sociale en economische behoeftes voor met name de migranten populatie. In veel steden bestaat een zeer aanzienlijk deel van de urbane groei uit 'Urban Villages'. Desondanks wordt in zowel de ruimtelijke beleidspraktijk alsook in het planologisch onderzoek het fenomeen 'Urban Village' vaak beschouwd als een relatief eenvoudig, statisch en homogeen stereotype van de migranten enclave. Daarnaast kennen 'Urban Villages' veelal een slecht imago als gevolg van allerlei maatschappelijke en milieu problemen, met als gevolg dat het stedelijk beleid zich meestal richt op afbraak en herontwikkeling. Een gevolg hiervan is de grootschalige uitplaatsing van haar bewoners, hetgeen zonder aangepaste huisvestingspolitiek leidt tot een tekort aan goedkope huisvesting. Een meer duurzaam beleid ten aanzien van 'Urban Villages' vraagt echter om een meer diepgaand begrip van haar ontwikkelingsproces en van haar ruimtelijke en sociaal-economische verscheidenheid.

In dit onderzoek is een theoretische en empirische analyse uitgevoerd naar de ruimtelijke ontwikkeling van alle 320 'Urban Villages' in Shenzhen gedurende de periode 1999-2009. De 'Urban Villages' zijn daarbij bestudeerd in hun ruimtelijke en bredere economische context. Specifiek is daarbij het ruimtelijke ontwikkelingsproces van 'Urban Villages' bekeken in termen van fysieke groei en functionele verandering. Hieruit blijkt dat het in de literatuur gebruikelijke beeld van 'Urban Villages' als statische en uniforme migranten enclaves incorrect is. Door middel van exploratieve ruimtelijke gegevensanalyses, multivariate modellen, en ruimtelijke regime modellen is de ontwikkeling van 'Urban Villages' en de daarbinnen ontstane diversiteit bestudeerd en verklaard in het licht van lokale ontwikkelingscondities, van beperkingen van individuele 'Urban Villages', alsook van het algehele stedelijke ontwikkelingsproces.

Dit onderzoek toont aan dat de groei van 'Urban Villages' vooral organisch en adaptief is. Haar ontwikkeling wordt in het bijzonder beïnvloed door de planning en ontwikkeling van de 'formele' - de haar omringende - stad en haar sociale en ruimtelijke diversiteit, maar blijkt tegelijkertijd ook samen te hangen met haar locatie binnen de stedelijke structuur. Daarbij zijn vijf hoofdpunten naar voren gekomen. Ten eerste blijkt de fysieke en sociaal-economische

ontwikkeling van 'Urban Villages' het natuurlijke en logische antwoord van de oorspronkelijke dorpsbewoners en rurale migranten te zijn op de snelle economische ontwikkelingen en sociale transitie. Ten tweede volgt het ontwikkelingsproces van 'Urban Villages' een vrij identiek verloop dat wordt gekenmerkt door drie te onderscheiden maar overlappende fasen (uitbreiding, verdichting, en intensivering). Ten derde vindt haar groei ruimtelijk geclusterd plaats ofschoon het centrum van de groei verschuift door de tijd, daarbij het patroon volgend van de algemene uitbreiding van steden en de spreiding van werkgelegenheid. Ten vierde wordt de ontwikkeling van 'Urban Villages' sterk bepaald door het aanbod van banen en de toegankelijkheid tot werkgelegenheidscentra, daarbij tegelijkertijd ingeperkt door fysieke en institutionele beperkingen zoals afnemende grondbeschikbaarheid en milieubeschermingsplannen. En ten vijfde reflecteert de ontstane grondgebruiksdiversiteit in 'Urban Villages' de variatie in lokale condities voor economische activiteiten en ontwikkelingen. Deze processen blijken verder sneller en meer versterkt op te treden binnen de centrale stad dan daarbuiten. Daarnaast varieert de snelheid waarmee een bepaalde 'Urban Village' zich langs deze ontwikkelingsfasen beweegt al naar gelang haar locatie in de stad en haar specifieke kenmerken.

De verwachting is dat 'Urban Villages' in Shenzhen zich verder zullen ontwikkelen qua dichtheid, intensiteit en diversiteit in grondgebruik. Tegelijkertijd zullen evenwel de vanuit overheidswege geëntameerde grootschalige herstructureringsprogramma's eveneens worden voortgezet. Daarentoont laat de huidige praktijk in Shenzhen echter zien dat er vele obstakels zijn voor de grootschalige implementatie van deze herstructureringsprogramma's. Bovendien brengt de grootschalige herstructurering van 'Urban Villages' grote sociale en economische risico's met zich mee als gevolg van de afwezigheid van plannen voor betaalbare herhuisvesting van grote aantallen migranten. Shenzhen en andere Chinese steden waar dergelijke grootschalige herstructureringsprogramma's worden doorgevoerd zullen zo aanlopen tegen het probleem van een tekort aan goedkope huisvesting en bovendien een dramatische afname in het aanbod van toegankelijke werkgelegenheid en diensten in de geherstructureerde gebieden. Deze gevolgen kunnen zeer ernstig zijn en kunnen een belemmering vormen voor het individuele welbevinden en de sociale stabiliteit. China's huidige stedelijk beleid moet daarom de belangrijke positie van 'Urban Villages' onderkennen, de huidige herstructureringspolitiek heroverwegen, en de richting opgaan van meer duurzame planning strategieën. Daarbij moeten bestaande interventiestrategieën zodanig worden verbreed dat ook ingrepen worden opgenomen waarin geen sprake is van massale afbraak. Zo zouden bijvoorbeeld maatregelen kunnen worden genomen die zijn gericht op het verbeteren en hervormen van bestaande 'Urban Villages'. Bovendien zouden financiële maatregelen kunnen worden overwogen zoals een onroerendzaakbelasting

voor woningen in 'Urban Villages'. Naast dergelijke strategieën zouden er betaalbare woningen moeten worden gebouwd voor rurale migranten, waarbij in de locatieplanning van deze woningen speciale aandacht zou moeten uitgaan naar het vraagstuk van bereikbaarheid.

CURRICULUM VITAE

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Peer-reviewed journal articles:

Hao, P., Geertman, S., Hooimeijer, P. and Sliuzas, R. (2012) The land use diversity of urban villages in Shenzhen. *Environment and Planning A*, (accepted).

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Hao, P. 'Migrant housing, urban villages and the impacts of regeneration policy in urban China'. The 26th Annual Congress of the Association of European Schools of Planning (AESOP), 11-15 July 2012, Ankara, Turkey (upcoming).

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Hao, P. 'Social and spatial diversity of urban villages'. International Seminar on Urban Development and Informal Settlements in China, 30 September 2009, Leuven, Belgium.

Hao, P. 'Unplanned urban development in Shenzhen, China'. International New Town Institute Conference on Planned vs. Unplanned City, 4-5 June 2009, Almere, The Netherlands (Invited speaker).

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