

ORIGINAL ARTICLE

Learning from the countryside: Designing in
Chinese rural-urban areasMaurizio Meriggi^{1*}, Mao Lin², Xiao Chu³, and Kan Chen⁴¹Department of Architecture and Urban Studies (DASU), Politecnico di Milano, Milano, Italy²Department of Environmental Design, School of Design, Southwest Jiaotong University, Chengdu, Sichuan, China³Department of Architecture, The University of Tokyo, Tokyo, Japan⁴Hangzhou Landscape Architecture Design Institute Co., Ltd., Hangzhou, Zhejiang, China(This article belongs to the *Special Issue: Reshaping Rural China*)**Abstract**

The current transformation of the countryside in the rural hinterland of Chinese city regions faces challenges in conserving an extensive architectural and landscape heritage. The villages situated in these regions represent the historical core of metropolitan areas. By examining the hinterland territories, we can readily recognize the features of the Chinese urban-rural continuum that G. W. Skippers has defined in his studies spanning from the 1940s to the 1970s on rural marketing networks, cities, and the hierarchy of the local system. These local systems present a morphology that continually adapts to geographical and cultural contexts, offering rich architectural and rural urbanism solutions that seamlessly harmonize the urban and rural functions. Today, this part of the settlement is extremely vulnerable to the pressure of urban expansion as towns evolve into cities and cities transform into metropolitan regions. The conventional top-down planning practice in these areas lacks innovative tools capable of integrating both “urban” and “rural” features simultaneously. Scholars such as M. Davis and G. Guldin have recognized the Chinese hybrid rural-urban settlement as a potentially “new form of settlement for humanity” (Guldin, 1997). In this article, we present a holistic design approach aimed at shaping this hybrid settlement into a “green city,” applying the model we first used in 2010 – 2013 in Huiyang in the Pearl River Delta, a region characterized by Hakka villages territorial system, to two other cases in city regions: Pidu in the Chengdu metropolitan area and Kandun in the Ningbo metropolitan area. These regions are characterized by their respective Lin Pan and Seawalls territorial systems, which we have more recently studied. The aim of the paper is to illustrate how drawing inspiration from local countryside architecture and rural urbanism enables the development of individual planning solutions as an alternative to the current planning practice in peri-urban rural areas, which tends to homogenize countryside landscapes to urban blocks.

Keywords: Urban-rural continuum; Hybrid landscape; Holistic design approach; Hakka villages architecture; Linpan architecture; Seawalls territory architecture

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1. Introduction: The urban-rural hybrid landscape in China and its roots

The growth of city regions in China, whether classified as megacities or megalopolis such as the Pearl River Delta (PRD), has been marked by aggressive and intensive urbanization of the agricultural hinterland territories on the peripheral areas of these city agglomerations since the early 1980s (Guldin, 1992). Our observation of this phenomenon, which was initiated almost 20 years after its inception, draws from our Hakka heritage preservation research.¹ We embarked on the mentioned study by analyzing cases of inland transformation in the PRD region, focusing on various stages of development in Hong Kong, Shenzhen, and Huizhou.²

“Spatial and social-economic transformation of these hinterland settlements in south China had been defined by G. E. Guldin as a hybrid landscape ‘(...) no longer clearly urban or rural (...) but a blending of the two’ Guldin, 2001, p. 14.”

In 2010 – 2013, when examining both Shenzhen and Huizhou, traces of the distinct components defining “urban” and “rural” patterns that form the “hybrid” landscape could be identified, as observed by Guldin in the 1990s. However, within the Shenzhen Special Economic Zone (SEZ), these components were no longer spatially distinguishable due to the intensive and rapid development that transpired during the 2000s.

The original “rural settlement” in this area was characterized by monumental, enclosed residences founded by Hakka immigrants, mainly during the 16 – 19th centuries. These residences were modeled after the *weilong* houses architectural style. They functioned as a fortified citadel, bringing together groups of families who shared a common ancestor, emphasizing the key ritual of clan culture (Hayes, 2001). In the center of these settlements stood a temple known as *citang*, which enclosed a crescent-shaped water pond in front, carrying apotropaic meaning.

In SEZ territories such as Longgang, the once “rural territory” that surrounded Hakka residences has been

progressively and completely overtaken by the compact and densely populated fabric of “urban villages.”³

In the first decade of the 21st century, the process of townization became even more intensive with the growth of high-density housing blocks, some rising to 17 floors, and vast industrial parks. During this period, certain Hakka residences, such as Hehu in Longgang, underwent transformations, serving as the local museum for the Hakka people, and the nearby original marketplace expanded, eventually becoming a shopping mall.⁴

It should be noted that the landscape observed by Guldin in the 1990s in PRD still retained a significant ratio of the rural landscape. It constituted a kind of urban-rural hybrid settlement, which was defined at that time as an “urban-rural integration” (*Chéngxiāng Yitihuà*). Davis (2004), in his report on Guldin’s studies from the 1990s comparing rural transformations in South China with Indonesian *desakotas* (Guldin, 1997), asserted that a new form of human settlement was emerging in China, blending rural and urban elements. In the areas observed by Guldin in Dongguan and Shenzhen, the rural component of this blend has all but disappeared today. However, as one moves eastward from Longgang to Huizhou prefectural territory in Huiyang district (also part of the PRD city region but outside the SEZ), the rural and urban components of the “hybrid landscape” in 2010 were still present and distinguishable.

When investigating the case study of Hakka villages (Figure 1) and attempting to recognize the historical structure of Huizhou and Huiyang territory (Figures 2 and 3), we followed the well-known studies by G. W. Skinner about the Chinese “urban-rural continuum” and rural marketing network, which provide an articulated explanation of the roots of the “hybrid” landscape described by Guldin: this landscape originated not through a rural exodus to the city but through an “urbanization *in situ*” (Friedman, 2005) of rural hinterlands.

Skinner’s works assume that the population density, the number of villages, and the distance of villagers (on foot) from the marketplace are the key factors that define the geographical structure of the urban-rural continuum. It can be schematized as a tiling of a hexagon, representing the marketing community area that collects a certain number of villages, each with its center in standard market towns.

1 Our research began in 2010 and continued until 2015, following a program outlined by the School of Civil Architecture, Politecnico di Milano, and the Technical Office of the Municipality of Huizhou. This program was developed within the context of a cooperation agreement signed in 2008 between the Italian Government and Guangdong Province of China.

2 A description of this comparison of cases is provided in Meriggi (2015, 2017).

3 For a detailed exploration of the specific characters of this urban type in Shenzhen and its transformation issues, please refer to Urbanus (2005).

4 A comprehensive survey of Hakka villages in eastern and north Guangdong is detailed in Meriggi (2018).

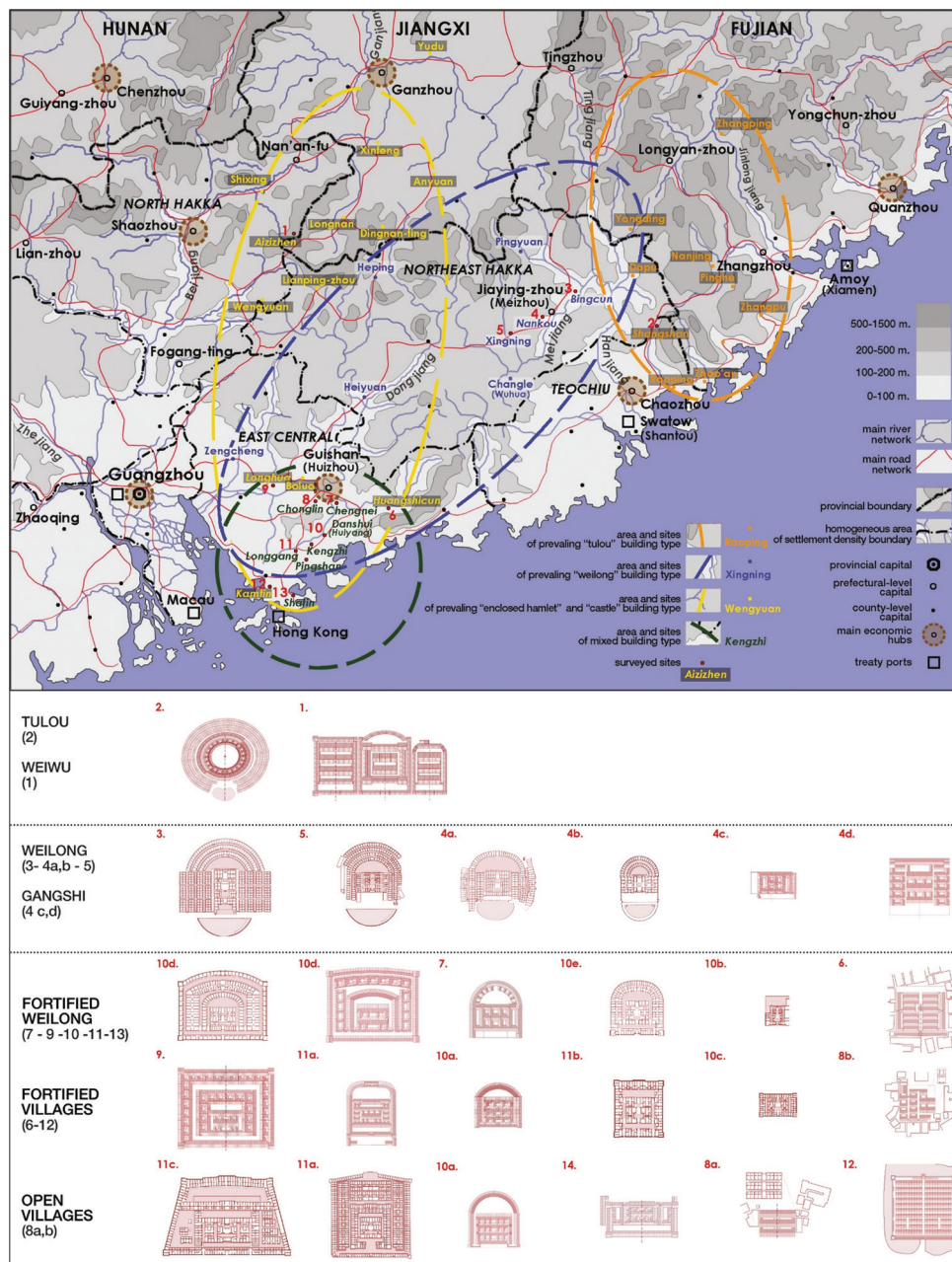


Figure 1. Geography of cultural areas of Hakka architecture in Eastern Guangdong. Orange: area of tulou buildings; yellow: area of weiwu buildings; blue: area of weilong buildings; green: area of mixed fortified building types. Source: Meriggi, 2018, p. 59

By surveying several cases in China (Skinner, 1964-1965), he determined that a marketing community for one market cannot consist of fewer than 6,000 people or exceed 12,000 people. In addition, the distance of the most disadvantaged village from the marketplace cannot exceed 8 km. He provides eight developing models based on hexagonal tiles that enable us to understand different situations depending on the density of population and number of villages – from the simplest and most homogeneous, with one standard

market town, to the most developed and inhomogeneous, with a network of market towns at different hierarchical levels and specialization (Figures 2 and 3).

In addition to this simple assumption, the variation in the structure of the urban-rural continuum depends on the geographical location of the marketing community, ranging from the simplest and isolated communities in mountain areas to those gradually becoming more articulated in continuous hilly and plain areas and finally

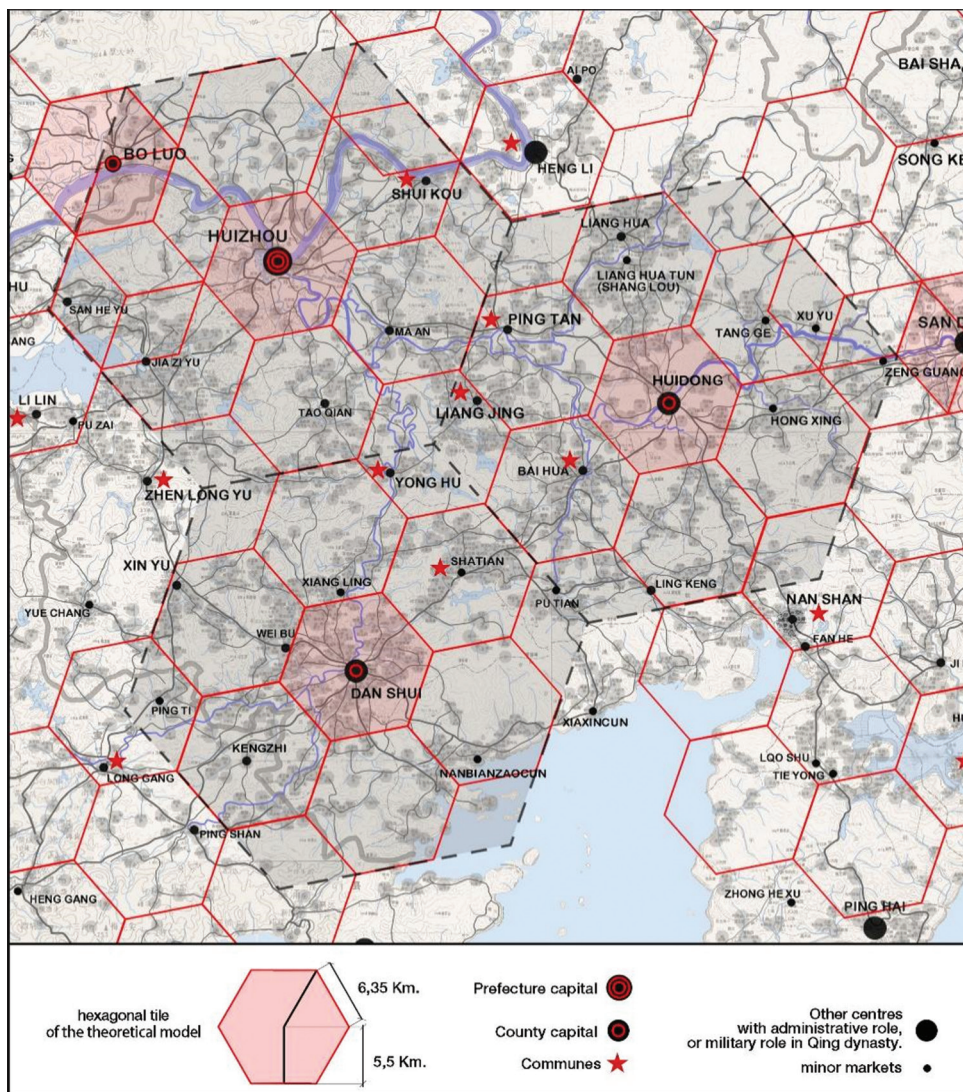


Figure 2. The theoretical model of the area of Huizhou prefecture marketing urban-rural continuum structure. The three centers of Huizhou, Huiyang, and Huidong form an equilateral triangle with sides measuring 33 km. The hexagons identifying the market areas have sides that are 1/6 of the distance between the three centers, equal to 5.5 km. Source: Meriggi, 2018, p. 38

to the most articulated and integrated ones in high-density deltaic areas.⁵

Skinner’s studies showed that a form of urbanization *in situ* already existed in traditional Chinese settlements and that the urban-rural continuum should be considered as a specific form of territorial structure characterizing Chinese urbanism. This structure matches the top-down network of administrative centers in the imperial bureaucracy, composed of cities at different levels following the geographical structure of the water flow hierarchy, on

the one hand, and the bottom-up organization of marketing activities that follow the distribution of villages around different levels of market towns and cities, on the other hand. These two networks intersect in what is defined as the “standard market town,” a type of settlement positioned between the village and the county due to its economic and social performance. These are small towns where rural marketing is conducted alongside urban functions, such as local administration, social regulation, and traditional rituals – like the *citang* of clan culture⁶ – as well as temples dedicated to local deities. In addition to these functions, there are institutions of higher education, referred to as

5 We could find samples for almost all the variants defined by Skinner in our work (2018) about Hakka villages and marketing communities in eastern and northern Guangdong Province.

6 More information about the clan culture and its origins, see: Faure (2006, 2007) and Hayes (2001).

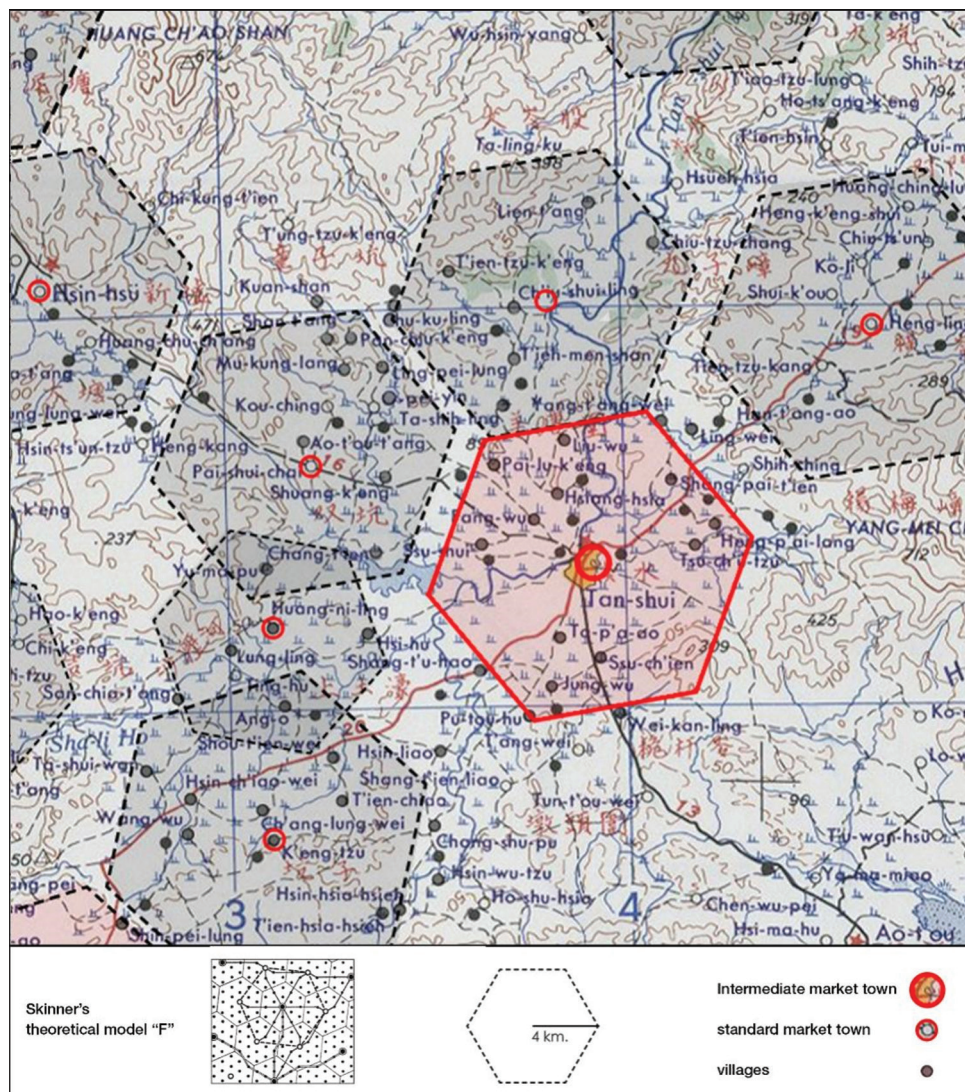


Figure 3. Marketing communities' areas in Huiyang. Source: Meriggi, 2018, p. 108

“Confucian academies,” which can be found in specific buildings in *weilong* houses and villages. These academics served as training grounds for the local administrators of imperial bureaucracy (Meriggi, 2018). Their presence here illustrates how, in traditional settlements, the “rural” also encompassed aspects of the “urban.”

In these lines, we have provided a synthetic description of the historical-geographical and economic model of the territorial structure of the Chinese countryside. This description stems from our research and design program, which was based on the following scientific questions: to what extent can the Chinese “urban-rural continuum” we observed in Huiyang and Huizhou, both as an analytical method and a design approach, be beneficial for contemporary development? To what extent can this

model also explain other cases in the hinterland of city regions in China?

2. Research method: Mapping and designing the Chinese urban-rural continuum for the green city of the future

The cases presented here include a brief description of the design approach adopted in Huiyang (Meriggi, 2015, 2017; Chen *et al.*, 2023) and the attempt to apply a similar methodology based on Skinner’s model of understanding the Chinese urban-rural continuum to two other cases of hybrid landscapes in China’s city region rural hinterland – the Pidun district in the Chengdu metropolitan area and Kandun town in the Ningbo metropolitan area.

These cases were selected to encompass a wide range of architectural and village types, as well as different geographical situations – an inner plain in Chengdu and coastal for seawalls towns in Ningbo. In this way, these different situations provide the conditions for stress-testing Skinner's territorial model of the urban-rural continuum network.⁷

In all the cases we collected, we followed a methodology based on three steps:

- (i) First, we addressed the problem of mapping the different forms that the urban-rural continuum model can assume, depending on geographical and cultural situations.
- (ii) Second, we investigated the different architectural types and village morphology as part of the model.
- (iii) Third, in some selected cases, we arrived at a design synthesis by proposing contemporary urban-rural continuum forms, drawing inspiration from the morphological and architectural models we found in the investigated cases.

These steps will be elaborated upon in detail within the descriptions of the case studies and design output in the following paragraphs.

All the projects we worked on assumed the form of the “green city” (Meriggi, 2009) as a possible model of urban development. This “green city” concept encompasses both “rural and urban” features and performances, taking into account landscape and activity complexity.

The cases of Pidu and Kandun, elaborated by the authors' Ph.D. and Master's Degree theses in 2021 (as described in the following paragraphs) illustrate how the phases of our methodology, initially experimented with in the case of Huiyang in 2010 – 2013, were consequently applied. Regarding the Huiyang case, where we have already provided substantial information, we will focus on the following lines on the design output.

3. Findings

3.1. Project: “Rebuilding from the countryside” (Huiyang, Huizhou, PRD)

Huiyang serves as the western intermediate market town in the triangular scheme of Huizhou prefecture's

⁷ In addition to these cases, as part of a PhD research project, our research group also considered Minnan villages in the Julong River Delta (Fujian) and water villages in Jiangnan (Zhejiang), highlighting the nuances of the urban-rural continuum in deltaic areas. We also studied historical villages in Huizhou (Anhui), revealing the nuances of urban-rural continuum in a mountainous area. The outputs of these investigations, which compare 6 different forms of urban-rural continuum, will be presented in an ongoing book titled *Mapping Chinese Urban-Rural Continuum*.

marketing urban-rural continuum structure, as illustrated in Figure 2. The territory of Huiyang consists of two “communes” (Figure 3): Danshui, with the town located in correspondence with the bridge of Danshui River (a tributary of Dong River) and Qiuchang, with two minor marketplaces (Xiang Ling, at the north, and Wei Bu, at the east). These marketplaces gather the marketing communities of 5 – 6 villages each, along with nearly one hundred *weilong*-type Hakka residences.

Both marketplaces were located alongside a river and a primary road – the former leading to Huizhou and the latter to Guangzhou.

The majority of urban development outlined in the Master Plan 2007 – 2020 (Figure 4) was concentrated in the Qiuchang commune territory. This development involved an increase in the presence of industrial compounds in Wei Bu villages, the establishment of new industrial areas, and the construction of residential and office blocks in Tie Men Shan villages. Agricultural land was preserved, with the exception of Zhoutian village, which was designated for use as an agricultural park. At that time, the common practice for the conservation of Hakka residences was the

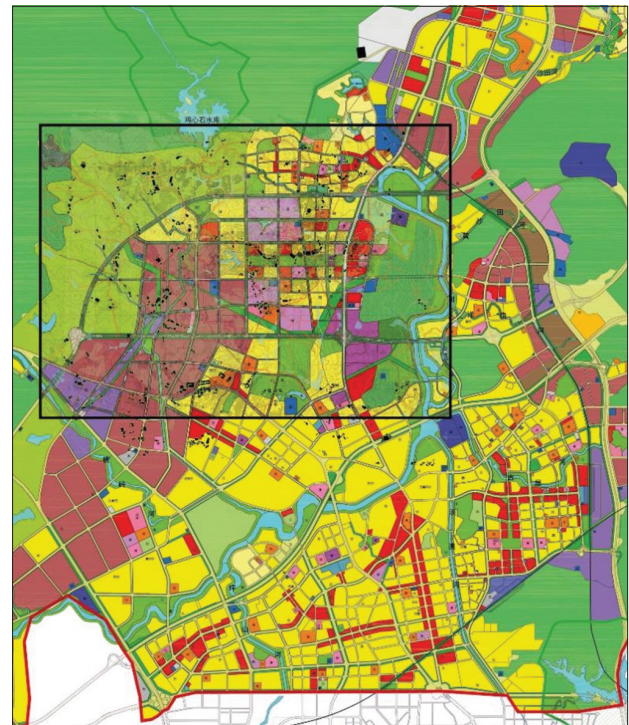


Figure 4. Huiyang Master Plan 2007 – 2020 (Huiyang Bureau of Housing and Urban-Rural Development, 2007). In the frame, the villages of the Qiuchang commune are highlighted in black (based on the 1979 Qiuchang Commune map). It is evident that the road network of the new city intersects and divides the historical Hakka residences. In addition, it is worth noting that many of the Hakka residences are situated within industrial areas. Source: Chen *et al.*, 2023, p. 11

establishment of a buffer area of 25 meters surrounding the building, excluding agricultural land (Huiyang Bureau of Housing and Urban-Rural Development, 2009).

Our proposal⁸, based on a survey of 43 cases of single residences in the Qiuchang commune territory, used the geographical distribution of villages in the areas specified for future urbanization as the foundational structure for the city's future development.

The proposed scheme (Figure 5, left panel) features a substantial green belt that stretches from the southeast

to the northwest, intersecting the urbanized area. This green space includes a central “parkway” and a segment of the Danshui River. It is surrounded by urban parks and agricultural areas, encompassing a significant number of Hakka residences along with their agricultural land. Within this scheme, the areas subject to more restrictive conservation rules are situated in Tie Men Shan and Zhou Tian villages, which collect agricultural lands containing the most important Hakka residences (A and B). Similar conservation rules are recommended for the natural areas along the Danshui River Valley on the east side (E). Additional satellite zones (C) have fewer restrictions on the conservation of the rural landscape. As for the densely urbanized industrial sectors on the west side of the city (D), it is proposed to shape the buffer zones surrounding the residences in a way that forms a continuous green corridor with integrated public facilities in the historical residences and villages.

Considering the significant number of residences in Huiyang territory with notable heritage value, a conservation strategy that would turn any of them into a museum was impractical, meaning that relying solely on tourism to support their conservation was not feasible. In addition, almost all Huiyang residences had been abandoned by the original Hakka communities. What appears to be a more realistic approach is to conserve the Hakka residences and their rural surrounding as part of the public facilities outlined in the Master Plan.

8 The School of Civil Architecture at Politecnico di Milano organized a team of professors and PhD students (nearly 25 researchers) with expertise in Architectural Composition, Architectural and Landscape Restoration, Urban Planning, and Interior Design. Several field trips and surveys were conducted in Huiyang territory during 2010–2011, involving the analysis of nearly 50 Hakka residences. These efforts resulted in the formulation of guidelines for adjustments to the Masterplan presented in Huizhou on 10.03.2011 (see: Milan Polytechnic University – School of Civil Architecture – Department of Architectural Design, 2011), along with an additional report in 2013 (see: Milan Polytechnic University – School of Civil Architecture – Department of Architectural Design, 2013a). The research were presented in two exhibitions: one at the School of Civil Architecture in 2012 and another at the Milan “Urban Center” in 2013. Details of the project, concluded in 2016, are presented in the book by Chen, Meriggi, and Tan, published in October 2023.

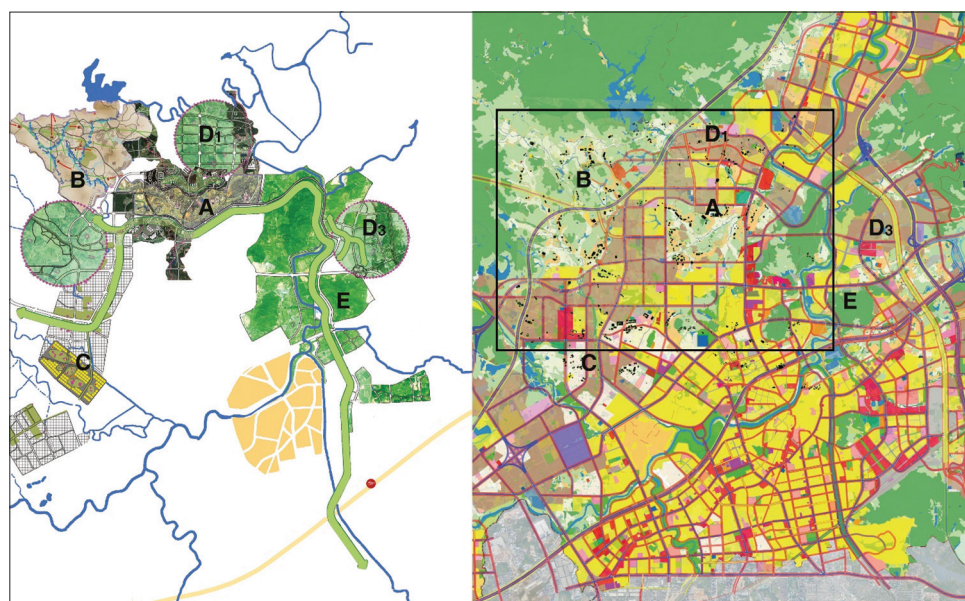


Figure 5. Left panel: Scheme of Huiyang’s conservation plan for Hakka heritage, including the proposal of the “parkway” connecting the historical and natural areas of Qiuchang commune and Danshui commune. Right panel: Huiyang Master Plan 2021 – 2035 (Huiyang Bureau of Housing and Urban-Rural Development, 2021). Within the frame, the villages of the Qiuchang commune are highlighted in black (based on the 1979 Qiuchang Commune map), with the letters (A-E) corresponding to the areas of the plan proposed by our team from Politecnico di Milano. Source: Chen *et al.* 2023, p. 95

A proposed methodology involved subdividing the territory into “landscape units” corresponding to the clusters of Hakka residences sharing common orography (hills and plains) and a water network (rivers and irrigational canals) within the boundaries of the 12 villages that make up the Qiuchang commune. Each of these clusters comprises several residences built by the same family “clan” following the rules of Feng Shui.⁹ Responding to the request of local administration, we provided a detailed plan for six landscape units (three in the “A” area and three in the “B” area).¹⁰ In these plans, we outlined criteria for architectural restoration, the reuse of historical residences, and guidelines for achieving a balance between new construction and rural activities while preserving functionality within the rural landscape. In this way, our approach embraced Guldin’s and Davis’s vision of a new kind of settlement, one that blends elements of both urban and rural living. Despite the age of their publications, their insights were invaluable for understanding the situation we encountered in Huiyang over the past decade. Our project was developed in consideration of this situation. Surprisingly, many of the most relevant suggestions we presented in our reports 10 years ago to the local administration concerning a strategy for conserving an extensive heritage within a process of urban development have been incorporated into the new Huiyang Master Plan 2021 – 2035.

The planning process may be slow, but when comparing the New Master Plan (Figure 5, right panel) with the one from 2007 – 2020 (Figure 4), several significant changes become evident: “A” area, originally designated for offices and housing with a very narrow green strip, has now been transformed into a large central park that includes historical residences and their agricultural land; the facilities of the new city, originally located in blocks alternated with residences and offices, have been relocated in correspondence with the historical nuclei of villages; a “parkway” linking different villages and natural areas (Danshui river and Mountain Park E) is forecasted, following the path we suggested.

9 Take the case of the clusters in Tie Men Shan and Ling Hu villages, which were built by the Ye family (Figure 6). See: Chen Z., 2023, Rural Fenshui in Huiyang Hakka villages in Tie Men Shan. In: Chen, Meriggi, Tan, 2023: 76-82; Tan, Z. (2023), Brief History of the Ye family in Huiyang. In: Chen, Meriggi, Tan, 2023: 189.

10 See: Milan Polytechnic University – School of Civil Architecture – Department of Architectural Design, 2013b. An extended and more detailed description of the landscape units, which includes 10 units and 43 residences in Qiuchang commune territory is published in: Tan Z., (2023), Atlas of Hakka residences in Qiuchang “commune”. In: Chen, Meriggi, Tan, 2023: 179-243.

In Figures 6-8, we present some samples of detailed projects for the C areas, featuring new activities whose morphology and typology are designed according to the hilly and historical context of the area.

An industrial park, a secondary school, a hospital, and samples of residential units are designed by incorporating Hakka architectural types and the logic of grouping buildings, following the land morphology of Hakka villages.

3.2. Project: “The New Linpan-er” (Pidu, Chengdu metropolitan area)

The project, “New Linpan-er,”¹¹ is located in Chengdu, where Skinner conducted his rural fieldwork and drew the rural marketing theory. It focuses on how to research rural settlements within the urban-rural continuum.

Linpan settlements are found in the Chengdu Plain, the fourth-largest city in China, with a population of 15 million people in 2016 (National Bureau of Statistics of China, 2022). In addition, Chengdu is a pilot city for urban-rural integration authorized by the Chinese central government, which means that many of the city’s villages require transformation.

11 The project, the “New Linpan-er”, is based on Mao Lin’s doctoral dissertation (2021), supervisor M. Meriggi. It has been developed by the author in a collaboration agreement since 2016 between Politecnico di Milano and the Faculty of Architecture of Chengdu Southwest Jiaotong University in collaboration with Pidu district (Chengdu) Linpan Association. The program was coordinated by prof. M. Meriggi (Politecnico di Milano) and prof. Liu Hongtao (Chengdu Southwest Jiaotong University).



Figure 6. Proposal for Tie Men Shan and Ling Hu “landscape unit” in the clusters of Hakka residences of the Ye family. Green: green corridors; red: Hakka *weilong* houses; brown: villages; white: new buildings, including an industrial park (A), a secondary school (B), a hospital (C), and a residential compound (D). The road network follows the topography of the hilly landscape. Source: Meriggi, 2015, 2017 and Acuto & Meriggi, 2023, p. 166-167

The most common type of rural settlement in the Chengdu Plain is the “Lin Pan” form. The character “Lin (林)” means “forest,” and “Pan (盘)” means “plate.” Linpan is a residential form that refers to both a small residential unit and an entire settlement system. In each Linpan unit, there is at least one family household at the center, surrounded by bamboo and other local arbors (Figure 9). The outer layer typically consists of fields and rivers. The word “Linpan” vividly portrays the form and pattern of the residential space (Ji, 2015; Shu *et al.*, 2013).



Figure 7. Proposal of a new secondary school in Ling Hu Village. Source: Meriggi, 2015, 2017; Acuto & Meriggi, 2023, p. 176–177

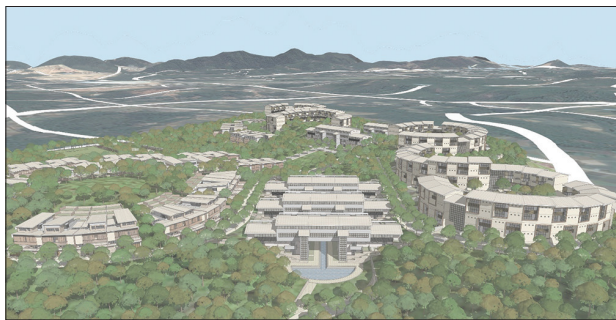


Figure 8. Proposal of new housing compound in Xiang Ling Village. Source: Meriggi, 2017; Meriggi, (with Belli), 2023, p. 158–159

The development and spatial distribution of Linpan settlements in the Chengdu Plain are greatly influenced by the ancient Dujiangyan dam and its irrigation system. This UNESCO World Heritage site features an irrigation water system that is over 2,200 years old and supports thriving agriculture across the Chengdu Plain. As a result, the region’s settlements have adopted a scattered and flexible mode of housing, with the Linpan being the most common type. Within the framework of this irrigation system, towns in the area are densely distributed on a small scale, while numerous rural settlements are evenly scattered throughout the region. The overall urban-rural continuum structure in Chengdu can be seen as a residential network consisting of variously sized Linpan settlements.

A translated map, published by the Army Map Service and created by the Corps of Engineering in 1958, reveals an evenly distributed pattern of cities and towns across the Chengdu Plain (Figure 10). The majority of these towns and cities align with the direction of the water system and are interconnected by roads that either parallel or intersect the watercourses, forming a stable spatial network. Consequently, the Dujiangyan water system functions as the foundational environment for the development of Chengdu’s urban-rural continuum structure (Fang, 2012).

To gain a better understanding of the scattered nature of Linpan settlements, we conducted a thorough analysis of their configuration logic by examining their satellite images. Our investigation focused on the morphology of these settlements and classified them into five distinct types based on the natural factors influencing their composition: camp, stream, concentration, meander, and line (Figure 11).

The research area, located in the Pidu District, lies between the Dujiangyan Irrigation System and Chengdu. The district has experienced rapid urbanization, transforming from a rural county into a thriving urban

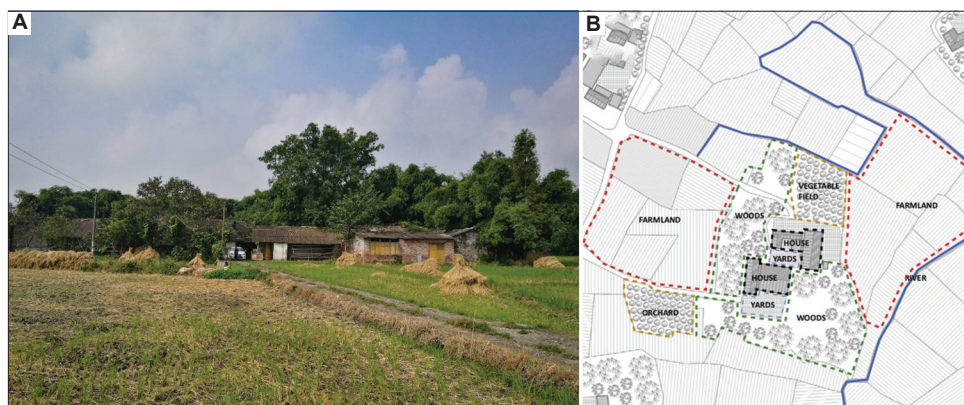


Figure 9. (A) The view of the Linpan landscape. (B) The composition of one Linpan settlement unit. Source: (A) Photograph by Mao Lin. (B) Lin, 2021

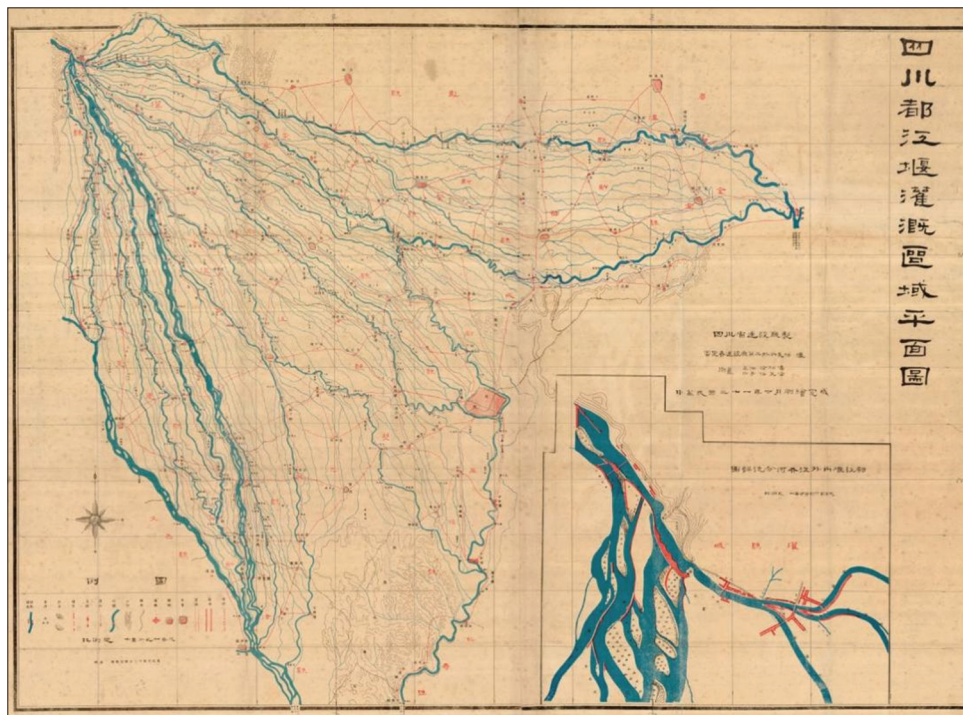


Figure 10. The water map of Dujiangyan Irrigation System was plotted in 1932. Source: Document of National Water Conservancy Bureau from Archives, Institute of Modern History, Academia Sinica (<https://archives.sinica.edu.tw/en/index.php/nggallery/thumbnails?project=national-water-conservancy-bureau-2>); the image was still downloadable in 2018 but appeared to have been taken down from the site as of November 1, 2023

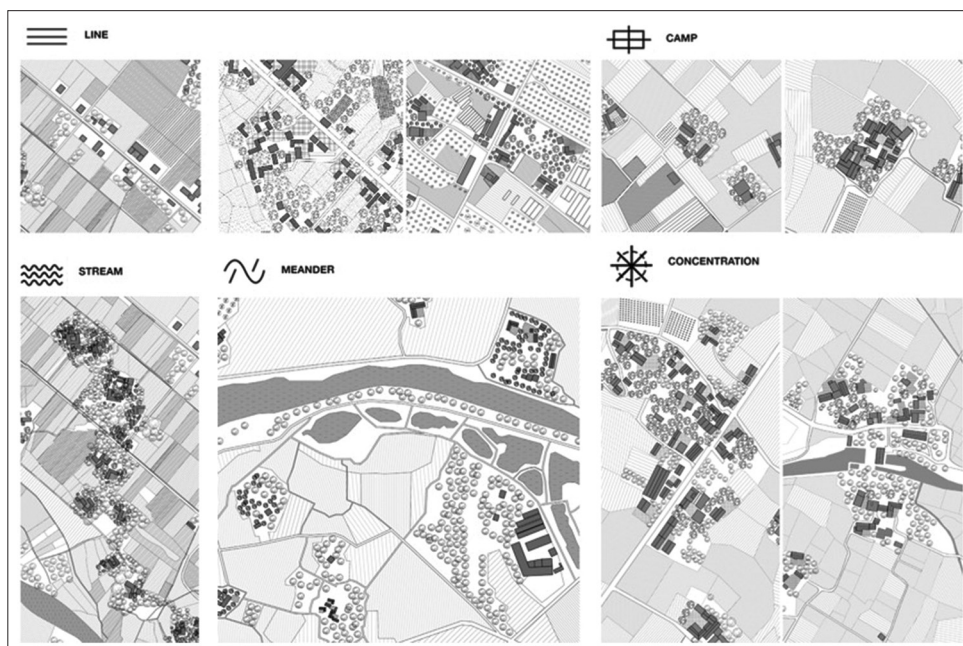


Figure 11. Morphology of Linpan settlements. Source: Compilation by Mao Lin

center, all while preserving its rural customs. This dynamic is clearly evident in the blending boundary, which vividly demonstrates the regional urbanization that takes place within the urban-rural continuum.

This project entailed an analysis of historical population data and population density, drawing on insights from Skinner's (1964) findings regarding the connection between community density and hexagonal radii to determine a

suitable radius for analysis in the studied area. Using the standard service radius of markets, defined as a person's 1-h walking distance (4 km), the gray-line hexagons were expanded to create a red-line hexagonal structure with a 3.71 km radius, effectively covering the entirety of Pidū (Figure 12). This result indicates a balanced and stable geographic distribution of standard markets, in line with Skinner's theory regarding the emergence of market towns and villages.

The decentralization of the urban population has inevitably led to an increase in rural populations. This trend underscores the need for improved transportation systems and increased settlement densities within the Linpan organizational structure. These transformative measures align with the growth of new villages under the traditional urban-rural continuum theory. Appropriately centralizing Linpan settlements and boosting their residential density achieve two crucial goals: meeting the housing requirements of modern rural communities and preserving cultivated land through more efficient land utilization.

3.2.1. Planning strategies under the urban-rural continuum

The dispersed configuration of Linpan settlements is characterized by a polycentric living style, rooted in the urban-rural continuum. In this arrangement, the population is not concentrated but resides in scattered

groups, each occupying individual houses and land for both living and farming. The fact that the new residents have access to sufficient farming conditions and possess their own territory aligns with the development law observed in the emergence of new villages within the urban-rural continuum.

Tangchang Town is actively boosting its local transportation network to enhance connectivity among neighboring communities. As part of this initiative, a monorail system has been proposed for its environmentally sustainable features, aiming to establish a link between Ande and Tangchang, ultimately connecting to the Chengdu-Dujiangyan high-speed rail passenger station in Ande. The Tangchang-Ande line, anchored by the monorail, will serve as the backbone, with future plans to progressively expand its reach to include other rural communities along the route. Figure 13 provides a detailed strategy for the smaller-scale square plot on the left side of Tangchang Town (the boxed area in frame A), further elucidating this plan. Situated amid a multi-functional urban-rural land, this block embodies characteristics of both urban and rural areas.

The establishment of Tangchang Station enables the monorail system to encircle the primary line within the fields. Following a site analysis, vital residential areas will be identified as primary station points. The monorail will be installed in keeping with the texture of farmlands, incorporating interchange points that link the local

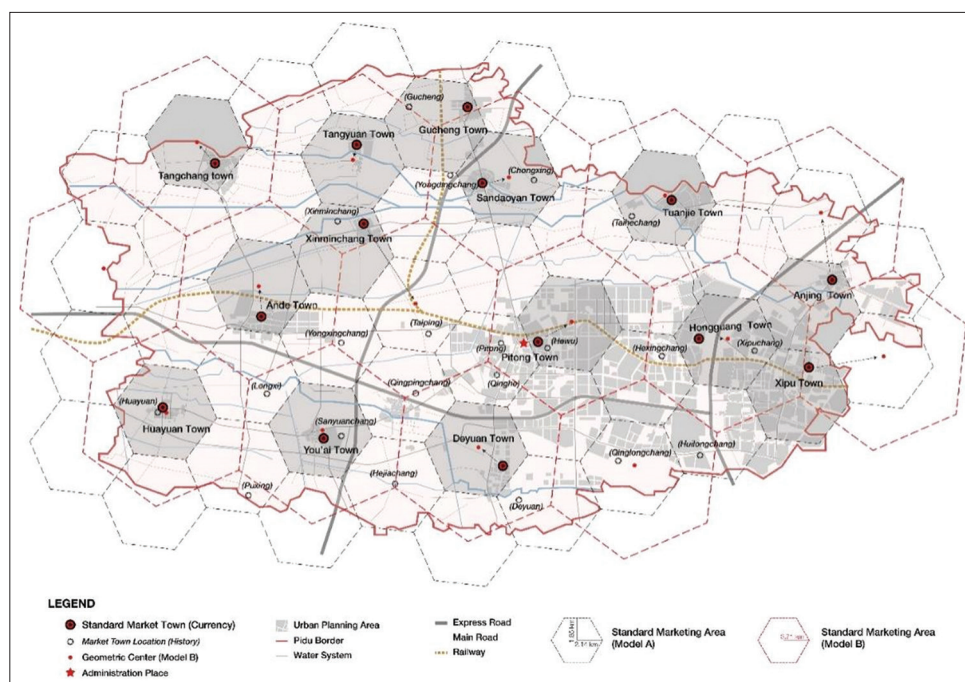


Figure 12. The urban-rural continuum based on the Pidū modern planning map. Source: Lin, 2021

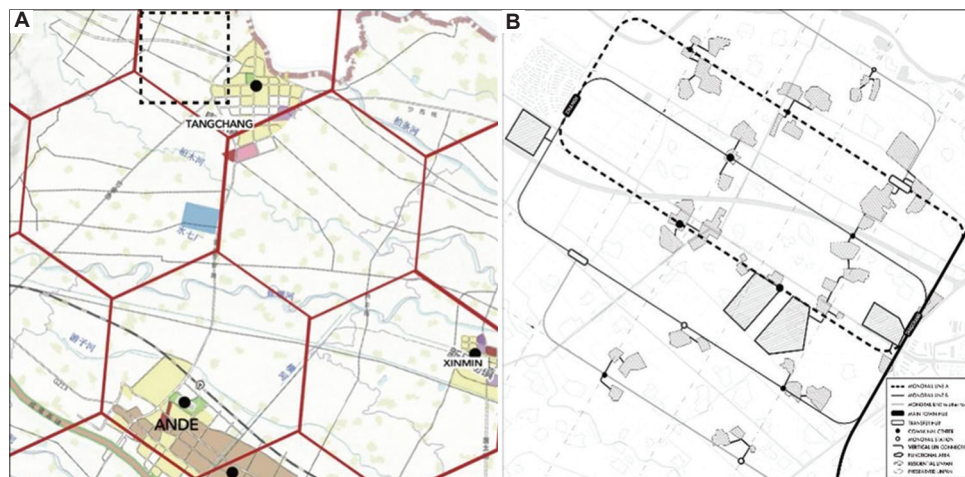


Figure 13. (A) The simplified urban-rural continuum structure around Tangchang Town. (B) The transportation network in the demonstration area. Source: Lin, 2021

communities to external areas. Stops will be positioned near essential public service facilities, thereby enhancing the visibility of communal architecture. Reserved Linpan settlements with specific functions will be seamlessly interlinked with adjacent stations, culminating in a holistic structural framework for this area.

3.2.2. The re-organization of rural communities in Pidu

The notion of “community” lies at the heart of the urban-rural continuum. Through the enhancement of transportation infrastructure and effective planning in Pidu, we can improve the accessibility of scattered rural settlements and strengthen the connections among Linpan communities of varying sizes. This method facilitates a more nuanced analysis of rural communities, allowing us to restore their organizational structure and identify the emerging potential for further development.

The introduction of monorail trains or other environmentally friendly forms of transportation brings about significant changes in the organizational structure of rural communities. It leads to the emergence of a group-based, transportation-centric arrangement, with major rail transit stations serving as the nuclei for large suburban communities. Secondary primary transportation systems then link these transit stations to peripheral rural areas, fostering the organization of these communities around the stations themselves. These communities become distinct entities within a certain scale while maintaining connections with smaller surrounding settlements at the local level.

As rural communities expand around monorail stations, transportation complexes can be established,

featuring large-scale public service buildings (as illustrated in Figure 14). Given the dispersed spatial layouts of Linpan settlements and the need to protect agricultural land, redesign efforts should prioritize the utilization and management of existing renewable Linpan areas. Secondary service-type buildings may be extended and developed around these stations, incorporating field paths as part of the framework. These structures may require specialized functions and must be carefully erected in line with the topographical and climatic conditions of the site.

Transportation hubs play a key role in the enhancement of communal buildings, serving as critical nodes that can foster the development of public service facilities within their vicinity. These structures act as vital conduits, revitalizing rural areas and offering residents access to opportunities akin to those available in urban settings. Effective transport infrastructure planning is also crucial, as it ensures efficient connections between these facilities, creating a cohesive network of communal architecture. Ultimately, public service buildings are indispensable in unifying the residential settlements in these areas, thereby spurring a surge in diverse public services to enrich rural life and reduce disparities between rural and urban accessibility.

In the case of Linpan settlements dispersed throughout farmland, a fundamental structural layout can be established by connecting them through field paths. The selection of sites for public buildings in the Linpan area should take into account various factors, such as location, environmental conditions, and the potential for reusing existing settlements.

When addressing the issue of designing new functional buildings with reference to urban types and in pursuit of the goal of achieving parity in public service levels between



Figure 14. The vision of the future city in rural Chengdu which draws inspiration from Linpan settlements. The central area of the image features a new complex comprising a multifunctional courtyard, residential towers, the pavilions of a secondary school, and an agricultural university. The locations of the stops of the suspended monorail are in correspondence with different clusters. Source: Lin, 2021

urban and rural areas, it becomes evident that the existing rural public buildings are insufficient to meet the growing demands of the population. Our on-site investigations in rural areas have revealed a dearth of public buildings, particularly in the domains of education and health care. Schools in urban areas boast superior facilities, equipment, teaching quality, and educational resources compared to their rural counterparts. Similarly, medical and health-care services are concentrated in cities, resulting in a relative scarcity of such services in rural areas. The phenomenon of rural hollowing-out has further exacerbated this issue, with an increasing proportion of children and elderly individuals comprising the actual rural population.

To address this issue, the proposal recommends the establishment of various public service buildings, taking reference from analogous structures in urban areas. These buildings include kindergartens, schools, research institutes, nursing homes, hospitals, agricultural green food factories, and other public facilities. The proposed sites for these new buildings primarily encompassed abandoned Linpan settlements, which facilitate the preservation of agricultural land. Furthermore, rural factories, greenhouses, and storage spaces for goods are also located on arable land near urban areas due to urbanization, highlighting the need for essential production and processing facilities in rural agricultural land.

When considering how to design new Linpan residential forms by “learning from” Linpan morphology and addressing the challenge of inheriting the characteristics of vernacular architecture, we have integrated Linpan attributes into contemporary architectural design through the study of typology and morphology. The rules derived from this study may be applied to assess the integration of new developments within their environment. Architects

can choose forms and types that align with the context of a location as references when conceptualizing design ideas for new urban settlements. This approach is particularly relevant for vernacular architectures, such as the Linpan settlement, which may lack distinctive architectural features compared to other Chinese dwellings.

In terms of morphological considerations, camp-style Linpan settlements are typically more secluded and situated away from main thoroughfares; therefore, they primarily serve residential purposes. Streamlined and linear Linpan settlements, influenced by farmland patterns, are often located along roads or rivers (ditches), possessing dual residential and public functions due to their proximity to busy routes. When transforming these areas, designers may incorporate certain public program elements. Meandering river Linpan settlements tend to feature large, open farmland areas suitable for group development, and their potential transformation should prioritize water resource management. Concentrated Linpan settlements, positioned at crossings of pathways, farmland textures, and waterways, usually exhibit more prominent public features. These sites represent potential candidates for adaptation into public buildings.

3.3. Project: “The Future of Seawall Towns” (Kandun, Cixi, Ningbo)

Cixi is a prefecture-level city under Ningbo, located on the Sanbei Plain along the southern coast of Hangzhou Bay. The main area in the Sanbei Plain has been shaped through sediment accumulation and artificial development. Since the Northern Song Dynasty (960 – 1127), the construction of seawalls has gradually reclaimed land, shifting the coastline northward. During the Ming Dynasty (1368 – 1644), the establishment of coastal defense stations accelerated the processes of polder reclamation and seawall construction. Over time, these developments, along with the continuous influx of immigrants, led to the gradual formation of settlements along the seawall.

The seawall system comprises the seawall itself, a buffer zone, and the seawall river. Given the absence of natural rivers in the newly acquired land, which hindered transportation and irrigation, an intricate network of canals was dug perpendicular to the seawall river, forming a dense water network throughout the Cixi area (Figure 15, left panel). The seawall rivers were termed *Tang*, while the canals were known as *Pu* (Guo *et al.*, 2023).

The seawall rivers (*Tang*) and canals (*Pu*) have shaped the morphological framework of the area. They have partitioned the land into strips and distributed settlements among them, giving rise to a distinctive morphological character (Figure 15, right panel).



Figure 15. Left panel: The seawall rivers (*Tang*) and canals (*Pu*). Right panel: The morphological features of the Cixi area are shaped by seawalls, canals, and settlements. Source: Compilation by Chen & Chu, 2021

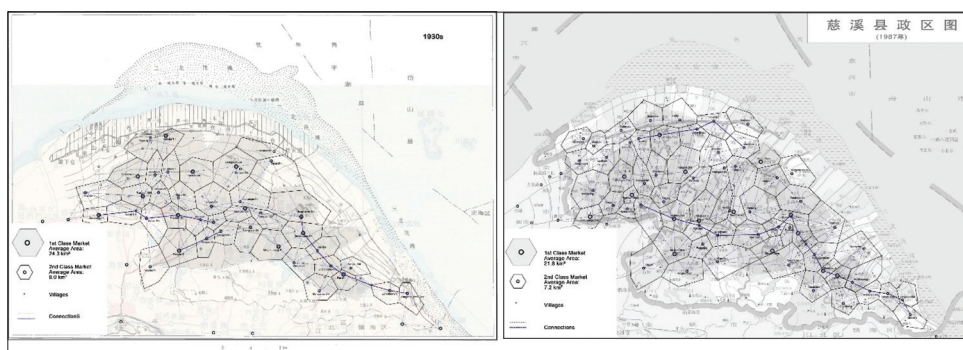


Figure 16. Market distribution in the Cixi area during the 1930s (left panel) and 1980s (right panel). Source: Compilation by Chen & Chu, 2021

This project¹² views the structure of the seawall in the area as a lasting framework. This framework is connected not only to history and memory but also demonstrates its adaptability to contemporary production models such as Taobao Village. Based on the urban-rural continuum, this study elucidates how the endurance of seawalls is manifested in the Cixi area, progressing from settlement cluster structures to morphological characteristics to building typologies at different scales, achieved through the use of Skinner's model, morphology analysis, and fieldwork. As a result, this project addresses this enduring aspect through an urban design proposal based on the research.

3.3.1. Skinner's model of the Cixi area according to the market system

The current settlement morphology pattern in the Cixi area demonstrates a tendency to spread, blurring the distinction between urban and rural structures due to rapid urbanization. At the scale of settlement cluster

structure, the establishment of Skinner's model can reveal the underlying structure of the settlement in the Cixi area.

By combining the information from *Cixi Shi Zhi* (Cixi Local Chronicles Compilation Committee, 1992) and historical maps, the map (Figure 16) depicts the locations of the markets in the 1930s and 1980s. Skinner's model mapping is obtained by creating Voronoi diagrams using the markets as the centers on the maps. The two panels underscore the decisive role of the seawall system in influencing the distribution of the market. The recorded markets' locations align with the distribution direction of the seawalls. This alignment is attributed to the high salt content of the Sanbei Plain's soil. Historically, the area north of the *Dagu* seawall in the Cixi region was predominantly engaged in cotton cultivation. The transportation of cotton outward and grain inward required a canal system (Geng, 2022).

Following central place theory, which is grounded in the concept of the most efficient transportation, it is established that each high-level market contains four low-level markets ($k = 4$). After analyzing the area data in Figure 16, the standard hexagon model (standard Skinner's Model) is formulated based on the mode of $k = 4$. This model, which elucidates the relationship between higher- and lower-level municipalities, confirms the reliability of the system through an overlay with satellite images from the 1980s.

12 The project is based on Chen Kan and Chu Xiao's Master's degree thesis (2021), supervised by M. Meriggi. In 2022, Chu Xiao extended the research through fieldwork and interviews in Kandun Taobao Villages, including Yulan Fruit and Vegetable Farm, Peninsula Flower Farm, Qingting Garden Farm, and Tian Shangjin Flowers. Part of the field research findings are published in Meriggi *et al.*, 2022.

The seawall system directly shapes the settlement's morphology, spatial layout, and the framework for plot division: different villages are linearly distributed along the seawall rivers (*Tang*), and the long and narrow village plots within each village are distributed along the canals (*Pu*). This morphological system contrasts with common block cities (such as the defense cities in the Cixi area during the Ming Dynasty). The settlements resemble combs, with seawall rivers (*Tang*) forming the backbone, extending along the canals (*Pu*), as depicted in Figure 16.

The standard Skinner's Model, explained in the previous sections, serves as the framework. Through a comparative analysis of the relationship between the seawall framework and the settlement structure in 2020, the settlement forms in the Cixi area can be categorized into five types (Figure 17, left panel). Type I, Type II, and Type III have corresponding relationships with the seawall framework. However, Type IV lacks a clearly defined morphological relationship due to its scattered distribution and small scale. Type V, on the other hand, has evolved from the defense stations established during the Ming Dynasty. Among these settlement types, Type I and Type II are the most common in Cixi and directly exemplify the influence of the seawall system on settlement morphology. These settlements are distributed along the seawall river sand and

expanded toward the canals. The key difference between Type I and Type II lies in the presence of two main axes in Type II. In addition to the seawall river, the canal also serves as the main axis to form a cross-shaped axis. Type III is distributed along the northernmost side, following the canal, and does not conform to a pattern along the seawall river.

The distribution of these five settlement types is also related to the expansion order of the coastline: Type IV and Type V areas are furthest from the current coastline and have been less affected by the construction of seawalls. Type I and Type II areas are distributed in the main seawall area. Type III areas are closest to the coastline, and they are of the most recent origin.

When considering the typology of the textures, particularly the relationship between settlement form and the building type, this relationship becomes apparent at the level of texture (Figure 17, right panel).

Based on the framework (comprising rivers and roads) and the filled areas (buildings) within this framework, the coordinate axis diagram depicted in Figure 17 is constructed. The abscissa axis in Type IV (Figure 17, left panel) indicates whether the built environment presented in the texture leans more toward a rural or urban character.

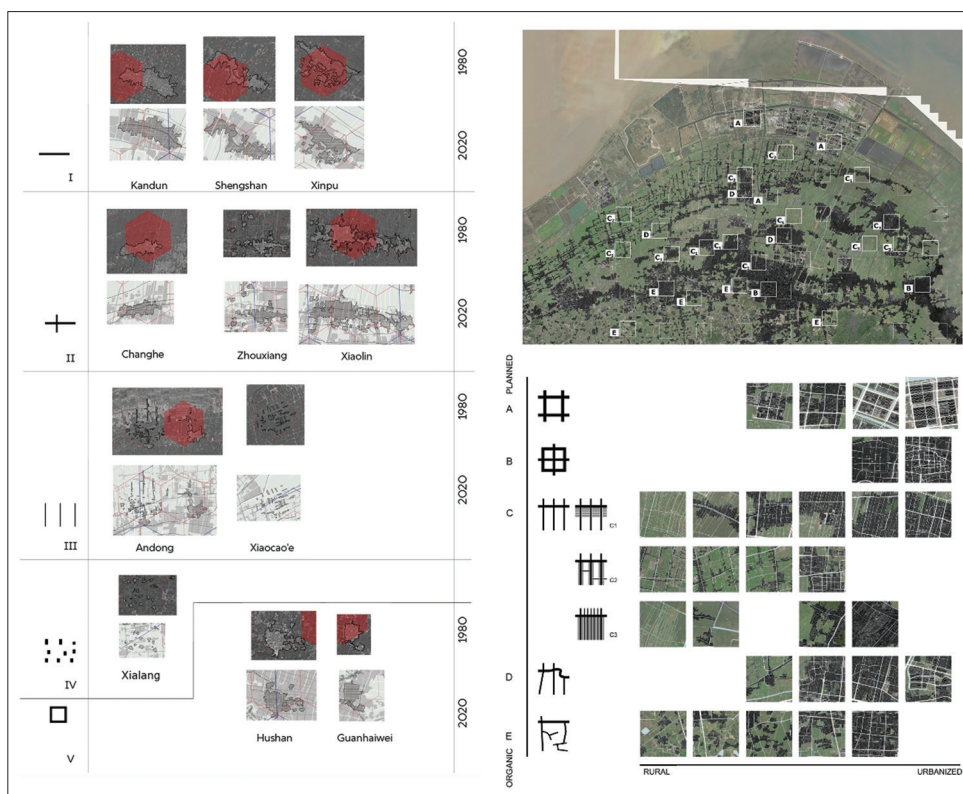


Figure 17. Morphological types of the settlement. Source: Compilation by Chen & Chu, 2021

The ordinate axis indicates whether the control grid of the settlement form is more inclined toward an organic or planned configuration. Unlike the simplistic urban-rural dichotomy, this classification provides a more nuanced response to the urban-rural division mentioned in Section 3.2.

Type III represents a morphological system determined by seawalls. As evident from the ordinate axis, this morphological system falls between planned and organic. The abscissa axis reveals that this morphological system spans the entire spectrum from rural to urban areas, demonstrating a high degree of adaptability.

3.3.2. Fieldwork in Kandun

Kandun is a town affiliated with Cixi, representing a typical example of the morphological adaptations previously mentioned. It adheres to the framework defined by seawalls and has adapted to populations of different sizes from the 1970s to the present.

The seawall framework not only serves as a morphological structure but also as an economic production structure. During the Jiajing period of the Ming Dynasty (1522 – 1566), residents in Kandun initially developed the salt and fishing industries along the beach. Subsequently, due to the continuous northward expansion of beaches, cotton and beans became widespread crops during the Qing Dynasty.

These main industries have fostered the growth of the handicraft industry. Salt workers required tools such as scrapers and shovels during the salt age, while fishermen needed fishing boats and hooks. The agricultural era necessitated items such as grass knives and fences, which local craftsmen provided. With the evolution of the cotton industry and the plantation of oil crops, cotton processing and manual oil workshops also began to be set up. Kandun has a long history of family workshops, where land is used for agricultural production, and housing plays a crucial role in the development of the handicraft industry (Fang, 2006). This production relationship has persisted in today's Taobao village¹³.

In the present day, Kandun comprises four Taobao villages. The distribution pattern of villages, established through the construction of seawalls, has laid the foundation for the present-day distribution of production areas and residential areas. The plot distribution pattern

along *Pu* within the village has also persisted into the contemporary era, adapting to the growth of the village population.

In the present situation, Kandun is demarcated by the Haitang river, resulting in a land use pattern where the built-up area lies to the south while the agricultural area extends to the north. The administrative boundaries of villages within Kandun are divided along the *Pu*, effectively segregating each village into two distinct areas (Figure 18).

Unlike the general case of single-function Taobao villages (AliResearch, 2019), this spatial configuration allows the four Taobao villages within Kandun to form an industrial model that encompasses both industry and agriculture.

Highly productive family workshops have played a pivotal role in driving industrial growth. However, driven primarily by economic considerations, individual villagers have been committed to maximizing and developing their homesteads¹⁴ in the most cost-effective manner. This has led to a chaotic and disorganized situation in this part of the built-up area. The production scale within these family workshops cannot be further expanded due to the limitation of available residential land. However, field research has revealed a phenomenon in which farms in the northern agricultural area have engaged in street beautification in the southern built-up area. It is a return to the tradition of mutual promotion between agricultural and residential areas in the Kandun area. The examples from the field research illustrate that the development model, formed by the spatial morphology and production pattern highly related to the construction of the seawalls, remains highly adaptable in the latest trend of contemporary Taobao villages.

3.3.3. Reshaping urban-rural continuum in Kandun

The Seawall-based urban-rural continuum system in the Cixi region faces a threat from contemporary generic urban design. In 2020, the China Academy of Urban Planning & Design unveiled the Qianwan New Area, which primarily covers the northern part of the Sanbei Plain, incorporating Kandun into its development plan. The objective of the plan is to transform this area into a new high-tech manufacturing city accommodating 1.25 million people by 2035.¹⁵ Within the Kandun area, a business office area dominated by towers is set to emerge, with the high-speed railway station as the center. This vision sharply contrasts

13 Since 2009, China has witnessed the phenomenon of using e-commerce platforms such as Taobao for product sales in rural areas. If the sales volume and the number of participating villagers reach a certain scale, these areas are officially recognized as Taobao villages.

14 Homestead is the land used by rural villagers to build residential houses, including land designated for housing, accessory houses, and yards.

15 Ningbo Planning Bureau; China Academy of Urban Planning and Design, 2018.

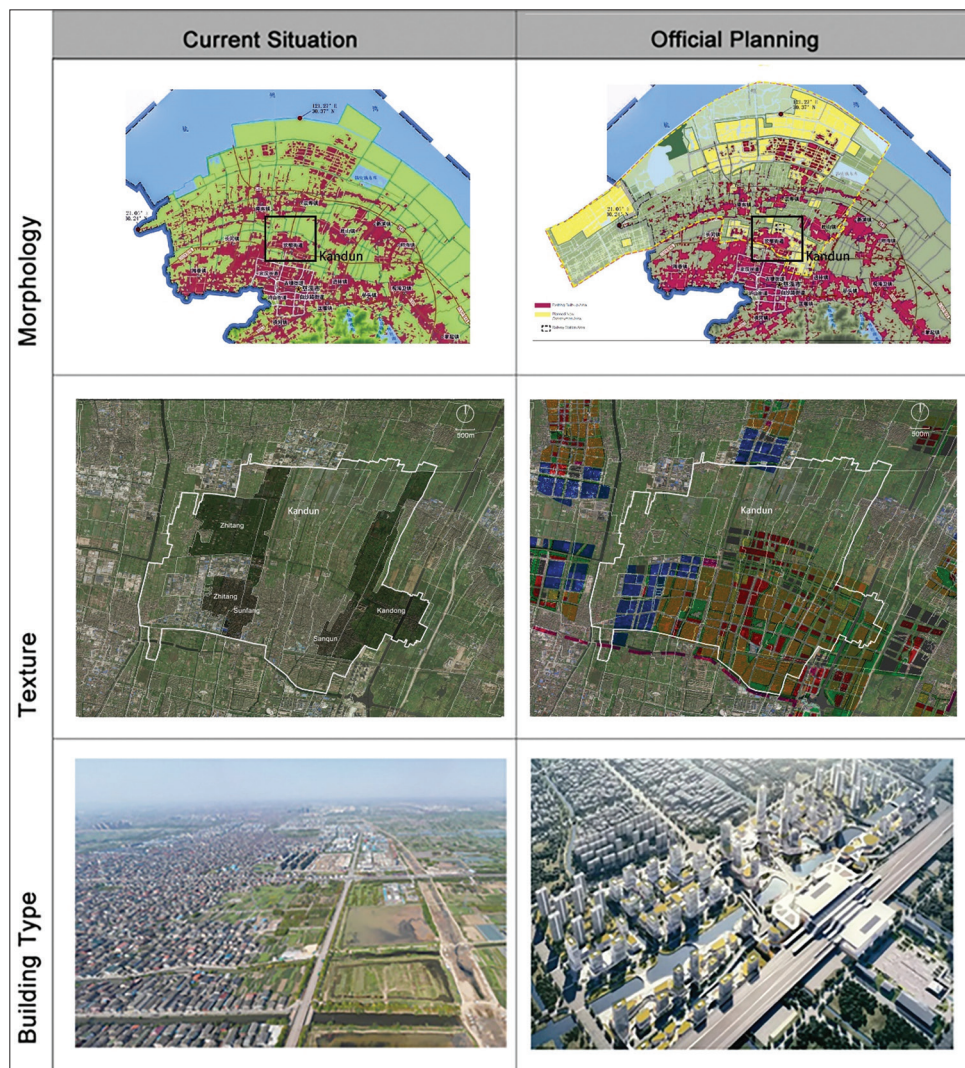


Figure 18. Comparison of planning and current situation. Source: Compilation by Chen & Chu, 2021

with the existing seawall-based settlement morphology within the planning scope and the dense arrangement of self-built houses by villagers based on the homestead concept in Kandun (Figure 18).

The realizability of the heroic imagination of official planning is doubtful, especially given the current high vacancy rate in office buildings in the central city of Ningbo. Moreover, it poses a threat to the bottom-up Taobao village economic model. However, the current low-quality built-up areas and small out-of-scale cottage industries in the Kandun area have become a constraint to development in the absence of guidance.

Drawing upon the insights presented in Sections 3.3.1 and 3.3.2, it becomes evident that the morphological characteristics associated with seawall-based morphology not only stand as remnants of historical processes but also

harbor the potential for fostering the development of Taobao villages characterized by a high degree of adaptability. Consequently, transforming the morphological framework of seawalls emerges as an alternative means of integrating bottom-up development and top-down planning.

Considering the current morphological characteristics of the Kandun region and its surroundings, our proposal encompasses different strategic actions. First, in the context of urban renewal along seawall rivers, the recommendation is to replace low-quality industrial zones with medium and high-density residential and commercial areas. Along the direction of the canal, a continuous complex of facilities, designed in a strip-like configuration echoing *Pu's* architectural form, is proposed. These facilities would serve as a structural framework for the growth of the village, accommodating growth through modular units

while maintaining defined spatial boundaries to prevent uncontrolled occupation on agricultural land. At the same time, this scheme exhibits a high degree of replicability

within the Cixi area. By adopting similar strategies in adjacent villages and towns, it achieves the same development intensity requirements specified by official

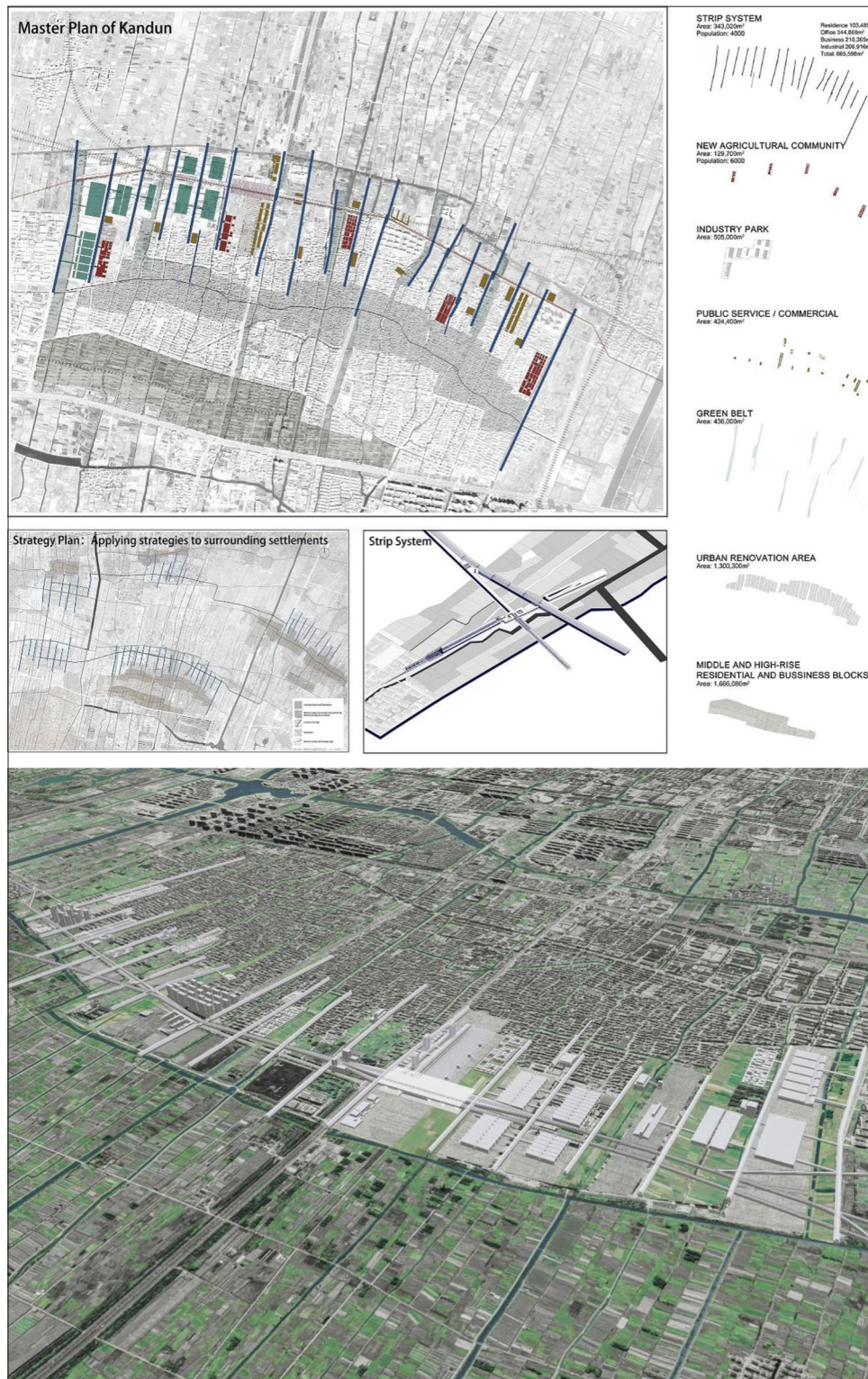


Figure 19. Seawall-based morphology scheme. Source: Compiled by Chen & Chu, 2021

planning requirements while injecting new vitality into the bottom-up economic model. Furthermore, capitalizing on the construction of a high-speed rail station as an opportunity, several nearby villages and towns can form a cluster of villages and towns with skyline connections. This configuration facilitates adequate linkages while maintaining the independence of individual villages and towns (Figure 19).

The master plan for Kandun presents more programmatic details: the strip volume defines the boundaries and becomes an infrastructure framework. Between the strips, volumes with different functions can be arranged. The distinctive morphological features can be reflected in a collage of top views and aerial views (Figure 19, upper panel). Within this framework formed between the buildings, areas for residences, factories, and a railway station can be flexibly arranged to form clusters with varying densities. The scheme provides a total of 860,000 square meters of new floor space for Kandun, fully addressing Kandun's recent development requirement.

The strip system operates as a system of modules capable of expansion, extending from the built-up area of the settlement to the surrounding farmland. The strip system demonstrates different variations in different areas, which are outlined as follows:

- (i) As a supplement to the high-density built-up area, the strip serves as a corridor facility on the ground floor, offering villagers co-production spaces for handling spillover orders from family workshops. A flexible building framework effectively organizes logistics, storage, production lines, and more. The second and third floors of the strip can be used as a complex facility combining offices and shops to cater to the needs of online stores and incubators. The fourth level can be designated for housing the floating population. Between the strip systems, various types of buildings can be developed to complement the activities supported by the preset strip system. This combination of strip systems and diverse building types enhances the scheme's versatility and adaptability.
- (ii) The SkyTrain station is connected to the strip system, functioning as a central node within the strip system. It facilitates transportation and commercial activities, serving as a hub that connects different infrastructures. It extends across both sides of the strip, spanning the carriageway and serving as an entrance to the park that leads to the skyline track.
- (iii) The strip system's extension into farmland can accommodate a range of facilities. As depicted in the upper panel of Figure 19, the roof remains open to the public for viewing the farmland. The interior of the

facility features space trusses, offering ample room for large exhibitions and product showcases.

4. Conclusion

The projects presented here aim to exemplify a design methodology based on the interpretation of the historical structure of the Chinese countryside. This methodology serves as a source of models from which to learn spatial configurations that originate from the specific context, perpetually evolving as one transition from one countryside landscape to another in China. It is important to note that this approach does not entail a simple repetition of history but rather a way to explore the values underlying these forms. This allows us to reshape our approach to future development in response to the current social situation. As an output of our first project in Huiyang, which embraced this approach and involved collaboration and dialog with the local administration, we could appreciate that the New Master Plan for Huiyang 2021 – 2037 effectively incorporates many of our suggestions. This integration has been thoroughly elaborated in Section 3.1 and Figures 4 and 5.

The perspective of the research presented in this study aims to include research materials from three ongoing case studies in peri-urban villages (Zhangzhou, Fujian; Jiang Nan, Zhejiang; Huizhou, Anhui) in a forthcoming publication. This publication will feature a methodological chapter intended for Chinese planners, illustrating potential approaches for integrating historical rural architectural and landscape forms into the construction of future urban development. This method will be based on six different case studies from monumental rural areas, each marked by unique local architectural cultures and geographical conditions.

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Conflict of interest

The authors declares no competing interests.

Author contributions

Conceptualization: Maurizio Meriggi

Investigation: All authors

Writing – original draft: All authors

Writing – review & editing: Maurizio Meriggi, Mao Lin, Xiao Chu

Ethics approval and consent to participate

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Consent for publication

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Availability of data

Data will be made available from the corresponding author on reasonable request.

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