



Redesign Waterfront Spaces Along Xi River in Yuantong Town

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Master Thesis Report Landscape Architecture, 2025
TU Delft

Acknowledgements

First and foremost, I would like to express my deepest gratitude to my dearest mentors, Gerdy Verschuure-Stuip and Marco Lub, for their unwavering guidance and support. Completing this project was an immense challenge, particularly as a landscape student venturing into interdisciplinary design for the first time. The journey was fraught with obstacles.

As a creative individual who has won numerous awards in artistic design and visual expression since childhood, I initially struggled to articulate my ideas through systematic thinking. Throughout this process, my mentors patiently helped me overcome these limitations. Their mentorship not only allowed me to conquer my weaknesses but also led me to gain profound insights and a more holistic understanding of myself. There were countless moments when I considered giving up, but their encouragement and expertise empowered me to persevere. This experience has been one of the most invaluable chapters of my life, and I will forever cherish the lessons and moments we shared.

Additionally, I extend my heartfelt thanks to my parents and my boyfriend. Their unwavering emotional support and comforting presence carried me through moments of breakdown and self-doubt.

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01

Motivation

This chapter introduces the unique cultural and spatial context of the Qingming Festival in Yuantong Town, focusing on its distinctive celebration style and the unusual setting where the festival takes place.

1.1The unique festival in Yuantong Town

Qingming Festival is a traditional Chinese festival. In most parts of China, people observe this day by visiting cemeteries to honor the deceased. However, in Yuantong Town, located in Chengdu, Sichuan, China, the Qingming Festival is celebrated with large gatherings and fairs(Fig 1.1). Known locally as the Qingminghui, this festival has a 270-year history(Jiang, 2024).

Unlike most other regions in China(Fig 1.2), the Qingming Festival in Yuantong is closely tied to agriculture. Yuantong is a rice-growing region, and Qingming Festival marks the arrival of spring, a time when farmers prepare to plant rice. Historically, Yuantong's Qingminghui Festival was the largest agricultural trade fair in the western Sichuan plain. People gather to sell farm tools and pray for a bountiful harvest. The market is set up in a natural, temporary waterfront space in the middle of the river. Every spring, as the river's water level drops, people make use of the natural gravel deposits to establish a temporary marketplace, where they also hold sacrificial ceremonies and cultural performances. The Qingming Festival here is a grand and unique event.

Fig 1.1: the Qingming Festival celebrated in the Yuantong Town

Source: image found via Baidu Image Search



Fig1.2: the Qingming Festival celebrated in the other regions in China

Source: image found via Baidu Image Search



1.2 The Unique waterfront space for the festival

In addition to the distinct theme of the festival, the location where the festival takes place is also remarkable.

The market is held on a natural gravel bed(Fig 1.3), a temporary waterfront space situated in the middle of the river. Along the riverbank, the festival area is organized into sections: a farm tools area, entertainment area, food area, department store area, and a cultural activities area. Each spring, as water levels recede, people utilize the river's natural sediment deposits to set up the temporary fair and hold various cultural ceremonies and performances (Fig 1.4).

This unique landscape and event setting sparked my research interest and raised several questions. Why is this festival so closely tied to agriculture? Why does a small town hold such a large-scale event? And why is the festival held on the river itself?



Fig 1.3: Gravel Land during the Qingming Festival

Source: Google map



Fig 1.4: temporary fair on the gravel Land

Source: image found via Baidu Image Search

02

Introduction

This chapter introduces the unique relationship between the Qingming Festival in Yuantong and its connections to water, agriculture, and commerce. It explores how the region's distinct history, hydrological systems, and agricultural practices have shaped the cultural and economic activities in Yuantong, with a focus on the Qingming Festival.

2.1 District context

Qingming Festival and its connection to water and agriculture

Yuantong Town is part of the Dujiangyan Irrigation System (Fig 2.2), which has a history of over 2,000 years and is listed as a World Cultural Heritage site. In ancient times, this area faced water shortages in spring and frequent floods in summer. According to the Editorial Committee of the Dujiangyan Water Conservancy Chronicle (1983, p. 7), in 276 BCE, Li Bing and his son utilized the terrain to construct the Dujiangyan headworks. With the Fish Mouth Water Diversion Hub as the core, the entire irrigation area is divided into the Inner River Irrigation District and the Outer River Irrigation District (Sichuan Provincial Local Chronicles Compilation Committee, 1993, p. 178).



Fig 2.1: Water Release Ceremony at the head project of the Dujiangyan Irrigation System during Qingming Festival

Source: image found via Baidu Image Search

The construction of the Canal Head Project solved the issues of floods and droughts, significantly improving the harsh agricultural conditions of the time. According to Tan Xuming (2009), regardless of the dynasty, the Dujiangyan headworks are regularly maintained and repaired every year, which is why it is referred to as the 'annual repair' (Sui Xiu). This work is typically completed before the Qingming Festival. After Qingming, the local people would dismantle the water control structures to allow the water to flow freely, ensuring proper irrigation for rice planting downstream (Fig 2.1).

As the irrigation area continued to develop, various irrigation projects and maintenance activities became more refined. Over the centuries, the annual maintenance process evolved into a local tradition. Every year, people in the irrigation district would conduct repairs around Qingming and celebrate with ceremonies after completing the work.

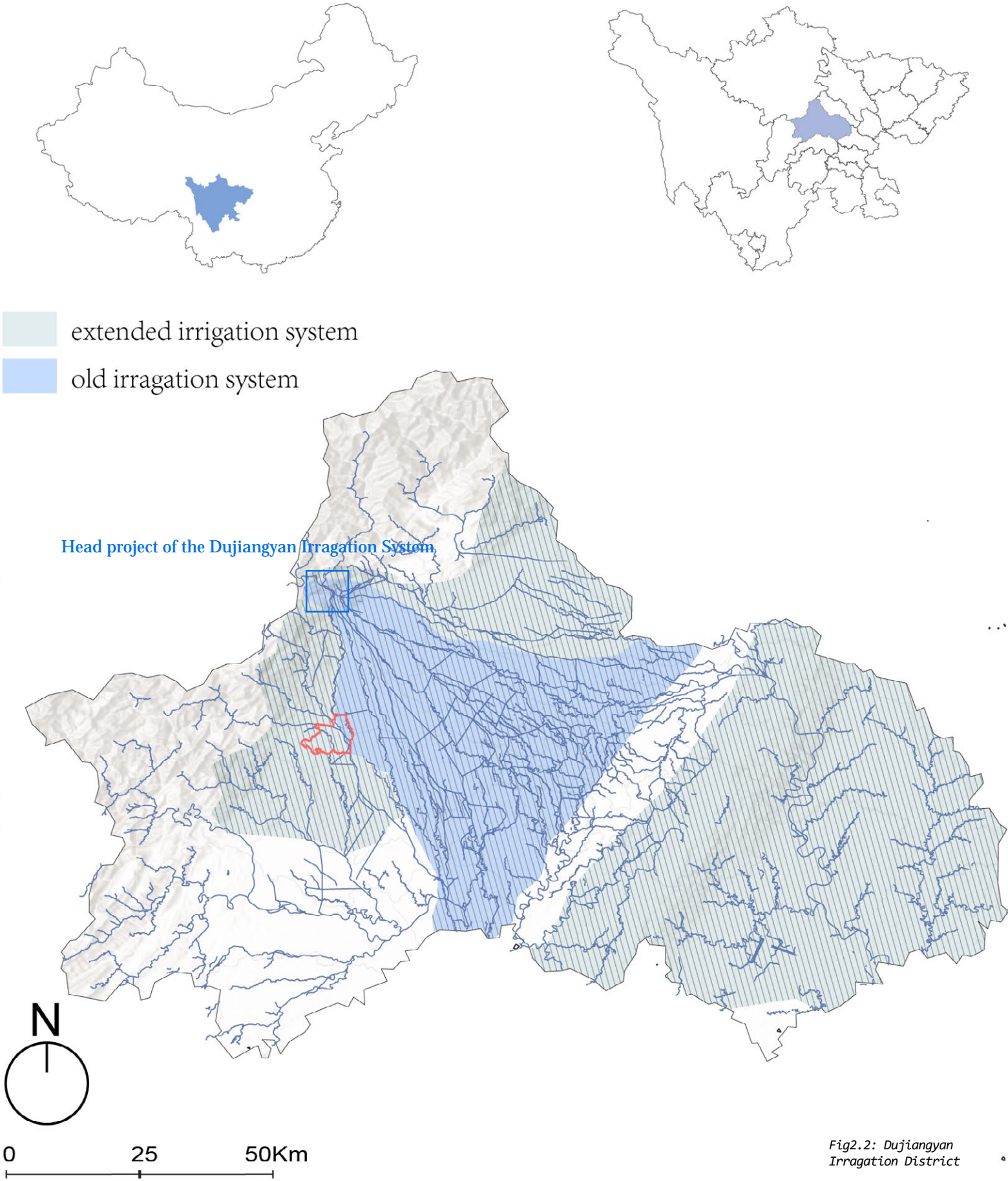


Fig2.2: Dujiangyan Irrigation District

2.2 Local context

Yuantong's strategic location

Yuantong Town, with a history of 1,650 years, lies in the western part of the Dujiangyan Irrigation District. Here, the Bo, Wenjing, and Wei Rivers merge to form the Xi River, providing abundant water resources to the town (Fig 2.3). The Xi River serves as a supplementary water source for the irrigation district, benefiting surrounding areas that the Dujiangyan system cannot reach.

Fig2.3: Xi River
flowing through
Yuantong Town

Source: image found
via Baidu Image
Search



Fig2.4: Dujiangyan
Irrigation District

Source: image found
via Baidu Image
Search



Yuantong Town was built along the banks of the Xihe River and is a typical market town(Fig 2.5). According to Liu Senlin (2014), towns that developed from marketplaces are referred to as market towns. Built along the Xi River, Yuantong evolved into an important transportation and trade center due to its location at the confluence of three rivers. The town gradually became a hub of commerce and culture in the region. As an agricultural trade fair began to take shape in 1737, the Qingming Festival became a large-scale fair event (Fig 2.4). The festival offered an opportunity for local farmers to sell tools and seeds needed for the spring planting season. Qingminghui, the local name for the festival, once became the largest agricultural trade fair on the western Sichuan Plain, drawing people from neighboring areas to Yuantong.

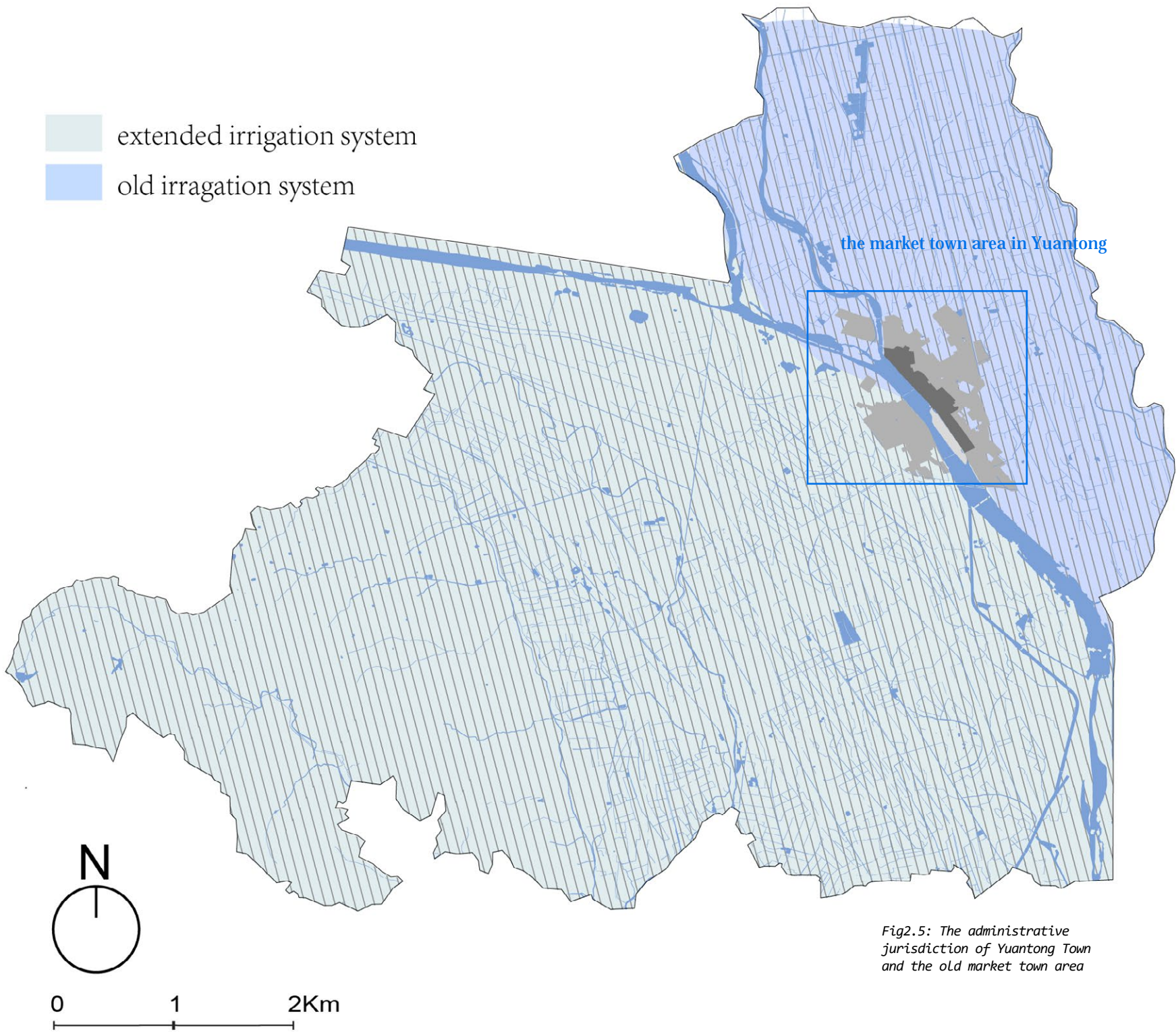


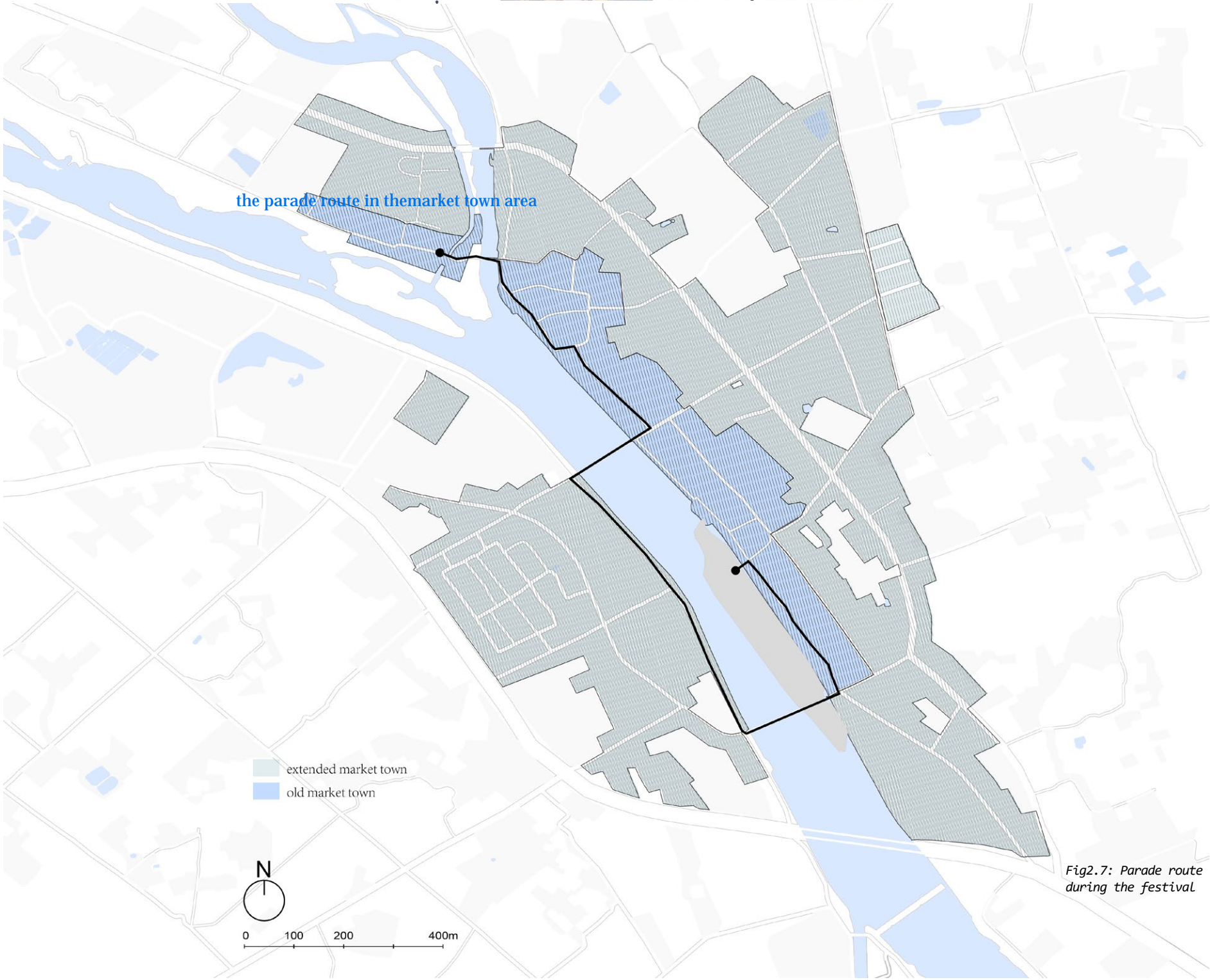
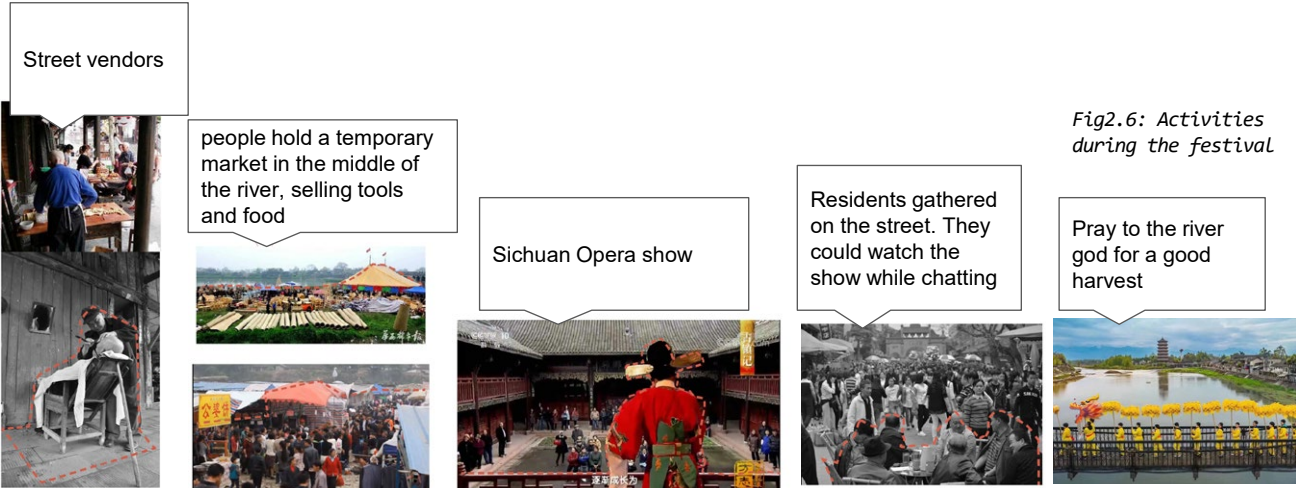
Fig2.5: The administrative jurisdiction of Yuantong Town and the old market town area

2.3 Town's context

Festival, river, and the cultural landscape of Yuantong

As introduced in Section 2.1, the Dujiangyan headworks were guided by Li Bing's water management principles of "adapting to local conditions" and "using locally sourced materials." These principles emphasized guiding water flow according to natural landforms rather than resisting it, fostering a harmonious coexistence between humans and nature. "Using locally sourced materials" encouraged people to build levees with materials like bamboo and stone from the area.

Influenced by these ideas, locals chose a natural gravel bed in the middle of the river as the site for the festival, minimizing human intervention in the landscape. Since rainfall is crucial for agriculture in this area, the festival includes parade (Fig 2.7), as people believe that river spirits will bless the crops if honored. In preparation for the Qingming Festival, locals clear rivers, channels, and embankments, and they gather during the event to sell agricultural products. Visitors include tourists as well as friends and family of residents. During the festival, locals display various tools and seeds for sale and cook large meals to welcome guests. Over the years, the Qingming Festival has grown into a symbol of Yuantong, representing both its cultural heritage and social connections (Fig 2.6).



2.4 Conclusion

Historically, Yuantong's unique waterfront space and festival traditions have been shaped by traditional water management techniques and Li Bing's water management philosophy. The choice of the riverbed as the festival location reflects a deep-rooted respect for natural landscapes and local resources. Yuantong's role as a commercial center has also fostered a large-scale festival that serves as a major trade market. Today, the festival has become a symbol of Yuantong's identity, establishing the town as a cultural, social, and economic hub.

03

Problem Field

This chapter examines the impact of climate change on water resources and festival activities in Yuantong Town, focusing on the region's water shortage issues. The town faces increasing challenges in agricultural irrigation and flood management due to alternating droughts and floods caused by climate change. Additionally, with the growing number of visitors during events like the Yuantong Qingming Festival, the current festival space is inadequate, leading to concerns about the loss of cultural identity and the need for more space. The chapter discusses the multiple pressures Yuantong Town faces in terms of climate change, insufficient festival space, and the erosion of cultural identity, offering insights for future spatial planning and water resource management.

3.1 Climate change

3.1.1Coexistence of droughts and floods

Yuantong is located on the Chengdu Plain, a region that faces both drought and flood challenges due to uneven annual precipitation distribution and significant year-to-year variations. The area's extensive rice cultivation requires large amounts of water, particularly concentrated in the spring planting season (April to May). However, this period only receives about 16.6% of the annual rainfall, resulting in seasonal water shortages and increasing drought risks (Fig 3.1).

Most of Chengdu's rainfall occurs during the summer flood season, from June to August, accounting for about 59% of annual rainfall (Fig 3.4). Intense, localized, and sudden rainstorms in summer are the main causes of flooding in the Chengdu Plain (Fig 3.2). The Xi River, which flows through Yuantong Ancient Town, originates in a region prone to these heavy storms, further exacerbating the area's flood risk (Liao, Du, Du, & et al., 2021).

Fig3.1: Xi River during the dry period

Source: image found via Baidu Image Search



Fig 3.2: Xi River during the floods

Source: image found via Baidu Image Search



Fig3.3: Xi River during the normal period

Source: image found via Baidu Image Search



3.1.2 Exacerbation by climate change

Against the backdrop of global warming, the Chengdu region and the entire Sichuan Basin have experienced a marked increase in extreme precipitation events (Gao, Fan, & Wang, 2023). Regional rainstorms are a common occurrence in Sichuan Province, referring to rainstorm events with a broad impact range and longer duration. These regional rainstorms generally last 3 to 7 days, affecting an area of 100,000 to 200,000 square kilometers or more. While the disaster impact is generally moderate, in some cases, the intensity of rainfall can lead to severe regional flooding disasters (Lian, 2013).

According to the Chengdu Meteorological Station's statistical data, the number of rainstorm days in the past five years has increased by 30% compared to the historical average (Wang, 2024). This indicates that Chengdu is facing a higher risk of flooding in the future.

In recent decades, due to global warming, both the frequency and severity of droughts in Sichuan Province have intensified. Researchers Mao and Li (2019) analyzed drought trends in the Sichuan Basin from 1962 to 2017. They indicate that the interdecadal variation in the annual average number of moderate drought days and above in Sichuan Province shows a continuous increasing trend. Particularly since the beginning of the 21st century, under the backdrop of global warming, the trend of increasing extreme drought events has become more evident (Mao & Li, 2019).

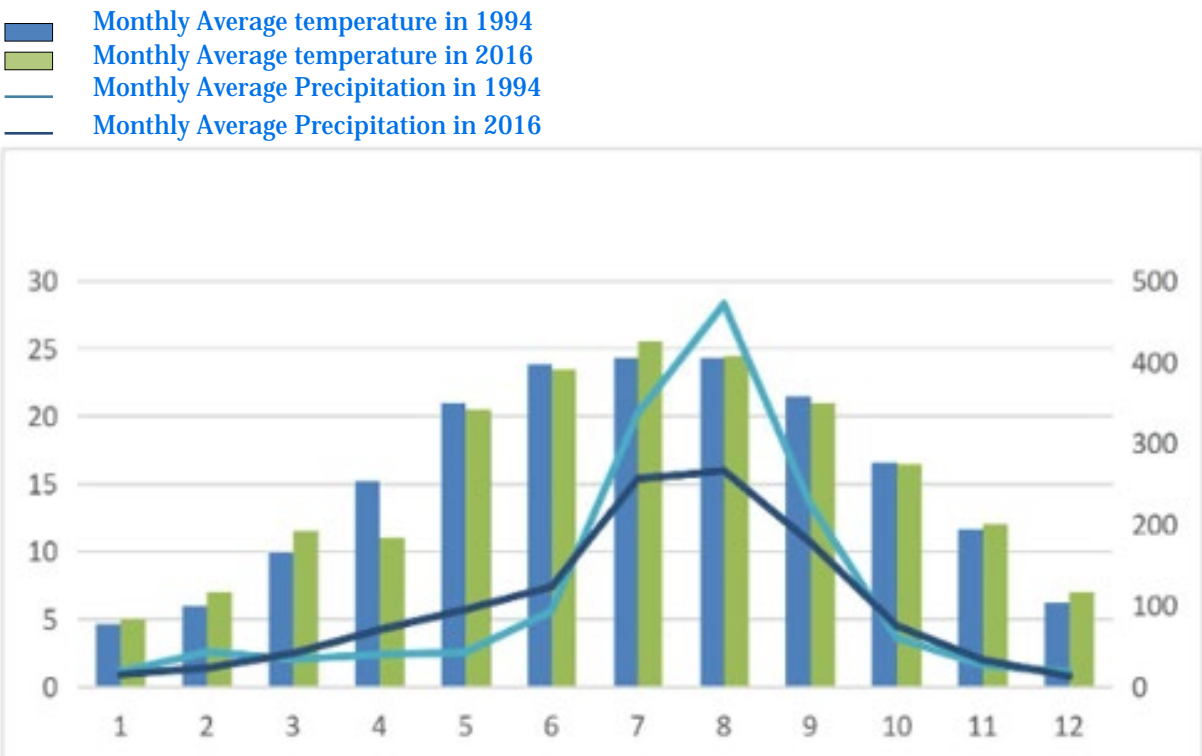


Fig3.4: The uneven annual precipitation distribution in the Chengdu region

3.2 Need for more festival space

Frequent spring droughts due to climate change have impacted rice planting. To ensure water diversion efficiency for downstream Sanhe Weir after the Qingming Festival, the river channel was dredged and the weir was removed in 2016. This also moved the Qingming Festival gathering to the streets on the edge of town, leading to a crowded and narrow venue that struggles to accommodate the influx of tourists.

Since 2014, Yuantong Ancient Town has been rated as a 4A-level tourist attraction (Zhao, 2014). The 'Yuantong Qingming Hui' was also successfully included in the provincial intangible cultural heritage list in 2023 (Chongzhou Cultural, Sports, and Tourism Bureau, 2023).The plan designates the Yuantong Qingming Festival as a key cultural tourism promotion project, which will likely attract even more visitors in the future. To support this growth, a larger festival space is needed (Fig 3.5).

丰富内涵 元通镇打出“度假生态宜居”牌

澎湃 政务：今日崇州 2022-09-21 12:20

实施“七大行动” 建设郊区新城

市委十四届五次全会明确了要围绕“锚定一个目标、做强三大功能、建设五大片区”，重点实施“七大行动”的工作思路。为深入贯彻落实全会精神，营造凝聚人心、团结奋进、干事创业的良好舆论氛围，崇州市融媒体中心推出《实施“七大行动” 建设郊区新城》专栏，系列报道我市部门、镇（街道）贯彻落实全会精神，科学谋划工作，开拓新局面、谋求新发展的有力举措，激励全市广大党员干部以更加昂扬的斗志、更加扎实的作风、更加进取的姿态，为加快建设绿色生态、宜居宜业、智慧韧性的郊区新城贡献力量。



Fig3.5: Yuantong Ancient Town is set to significantly develop its tourism industry

Source: https://www.sohu.com/a/586607609_121117478

3.3 Loss of identity

The waterfront market, held for only seven days a year, used to attract a large number of locals and tourists due to its unique location, serving as a social, cultural, and economic center and a symbol of local identity. After moving outside the town, the market has struggled to retain its appeal despite significant promotional efforts by local authorities (Fig 3.5). This shift has placed the market's identity at risk.

According to a news report from 2010, the Yuantong Qingming Hui began in the afternoon of April 2nd and lasted until the evening of April 7th. On April 4th, the Qingming Festival saw a peak in visitor numbers, with a conservative estimate of 130,000 people. During the entire Qingming Hui period, the number of visitors was expected to reach between 600,000 and 700,000 (Xia, 2010)(Fig 3.6). In contrast, news from 2024 reported that the visitor flow on April 4th, 2024, was only 49,500 (Zhang, 2024). This suggests that the Yuantong Qingming Hui is losing its attraction.

Fig 3.6: The Qingming Festival fair has been moved to the streets at the edge of the town

Source: image found via Baidu Image Search



Fig 3.7: The Qingming Festival fair in the past

Source: image found via Baidu Image Search

3.4 Conclusion

This project focuses on the waterfront space in Yuantong Town. Once the primary location for festival activities, this area now faces challenges from climate change, insufficient festival space, and a loss of site specificity, as it becomes increasingly disconnected from its traditional association with the river (Fig 3.8).

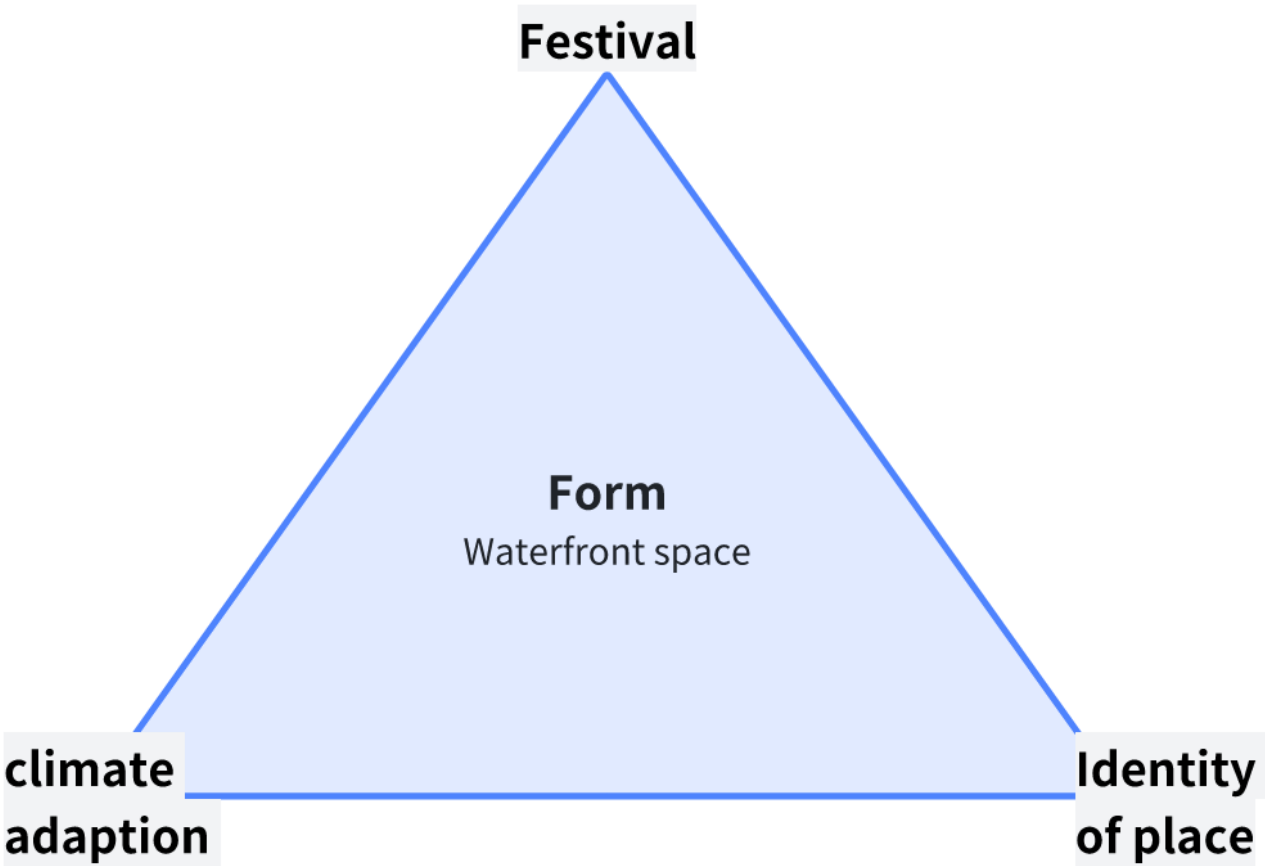


Fig 3.8: The waterfront space in Yuantong is currently facing several issues.

04

Research Question

This project focuses on finding solutions to the challenges faced by the unique waterfront space in Yuantong Town, which include climate change, loss of identity, and insufficient festival space. The aim is to improve water management to adapt to climate change, while also considering new forms of waterfront public spaces and spatial experiences to accommodate the growing festival. Additionally, the goal is to restore the local identity.

4.1 Main question

Given what was previously discussed, the following questions arise:

How to redesign waterfront spaces for the festival along Xi River in Yuantong town through climate adaptive water management considering the identity of landscape?

4.2 Subquestions

1. What water management techniques can be considered to restore the river's climate adaptability?
2. How do the form of waterfront public spaces benefit the new water management and facilitate the connection between festival and river?
3. How to reorganize spatial experience be enhanced to reveal the interaction between people and the river now and in the past?

4.3 Relevance

Scientific Relevance

This graduation project contributes to scientific discourse by integrating traditional water management wisdom with contemporary theories of landscape resilience, spatial production, and place identity. By combining top-down morphological planning with bottom-up pattern language analysis, the project proposes a novel design framework for climate-adaptive waterfront spaces. It introduces the concept of “meaningful form” as a synthesis of ecological function and cultural significance. The dual-scale methodology—linking regional hydrological planning with human-scale spatial experience—offers a transferable approach for addressing water scarcity, flood risk, and identity loss in similar cultural landscapes. The project thus advances theoretical and methodological development in climate-responsive landscape architecture and the interdisciplinary study of water, space, and culture.

Societal Relevance

This project responds to urgent local and global challenges—climate change, cultural erosion, and the need for resilient public spaces. By redesigning Yuantong’s waterfront to restore its ecological functions and reinstate its cultural identity, the project supports community resilience and sustainable tourism development. It revives historical festival practices through spatial design, reconnects people with the river, and creates flexible public spaces that adapt seasonally to both environmental conditions and social needs. The design empowers local communities by honoring their heritage and enhancing their engagement with place, offering a replicable model for culturally sensitive and climate-adaptive design in traditional towns facing modernization pressures.

05

Methodology

This chapter provides theoretical support to conceptualize the project, focusing on key concepts such as the meaning of landscape, the production of space, the identity of place, and climate adaptation. Concepts like "landscape resilience," "nature-based design," and "landscape biography" are crucial for helping waterfront spaces adapt to climate change while enhancing their connection with history. The theories of landscape meaning and the production of space help in understanding the links between climate change, identity, and festival activities, as well as in defining the theoretical framework and research approach for this project.

5.1 Theoretical framework

Design methodology is understood as the overall process that leads to a design solution, while design methods refer to the specific strategies used during various stages of the design process (Curry, 2014, p. 632). This research focuses on creating meaningful forms of waterfront spaces through festival activities, water management, and local identity design. By applying theories of space production and the formation of landscape meaning, a dual theoretical framework is proposed: top-down form design and bottom-up usage accumulation. This framework aims to achieve an organic fusion of functionality and local identity, ultimately constructing "meaningful form". (Fig 5.1)

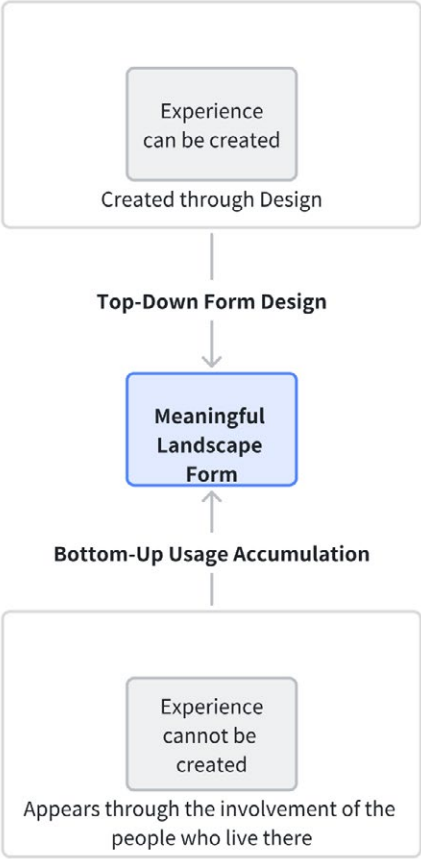


Fig 5.1: Theoretical framework

Top-down form design:

This section focuses on the physical form and experience of design, combining climate-adaptive water management with functional design for festival spaces. The goal is to form the basic structure and visual features of the waterfront space. According to the theories of Geoffrey and Susan Jellicoe, Nan Fairbrother, and Patrick Condon, "meaningful form" in the landscape can be produced through artifacts and designed experiences (Swaffield, 2022, p. 74). This approach uses a morphological method to intervene with human-designed elements, providing a framework for climate change adaptation, festival activities, and daily use. These interventions create foundational experiential scenes for both residents and visitors.

Bottom-up usage accumulation:

The second part addresses the accumulation of landscape meaning through community interactions and daily life. Edward Relph suggests that the meaning of a landscape cannot solely be assigned through design but must gradually accumulate through emotional investment and collective memory in long-term use. "Meaningful landscapes, or places, can only arise 'through the involvement and commitment of the people who live and work in them'" (Swaffield, 2022, p. 74). Waterfront space design is not only a physical location but also a space that can facilitate and support community activities and interpersonal interactions. The ultimate formation of spatial meaning requires long-term community use and interaction, which supports the "bottom-up" approach in design. This section uses a bottom-up pattern language approach to identify and reinforce the patterns of space usage by locals, ensuring the formation of a unique "identity of place."

5.2 Theory backup

5.2.1 The generation of meaning in landscape

Typically, the "ordering" of a landscape is achieved through the reconfiguration of its form. However, the influence of land artists has also led to a strategy of minimal intervention, where meaning is created by "reframing" the way we experience a particular setting (Swaffield, 2012, p. 73). This perspective emphasizes how subtle changes in how we perceive a landscape can create new interpretations and meanings, enhancing the relationship between people and place.

Laurie Olin argues that the primary inspiration for meaningful experience in landscape has always been Nature (Swaffield, 2012, p. 73). This highlights the importance of the natural environment in shaping our emotional and sensory connections to landscapes. It suggests that authentic experiences in landscape architecture are deeply rooted in our connection to nature, which serves as a timeless source of inspiration for meaningful spaces.

Geoffrey and Susan Jellicoe (1987), Nan Fairbrother (1970), and Patrick Condon (1988) focus on human artifacts as the source of meaningful form in landscape (Swaffield, 2022, p. 74). This emphasizes the role of human-made elements—such as monuments, structures, or pathways—in giving form to a place. These elements not only serve functional purposes but also carry symbolic weight, contributing to the cultural and emotional identity of the landscape.

On the other hand, Edward Relph offers a critique by suggesting that meaningful landscapes arise not just from the designer's interventions but through the involvement and commitment of the people who live and work in them (Swaffield, 2022, p. 74). This perspective emphasizes the importance of community engagement and the accumulation of collective memories over time. It suggests that true meaning in landscapes is developed through people's interactions, experiences, and emotional connections with a place, making it a living, evolving entity.

These viewpoints all agree that experience is paramount when designing form. In the case of the waterfront space in question, this means that both the physical form (top-down design) and the way people use and interact with the space (bottom-up participation) must be integrated to create a meaningful place. The combination of these approaches is crucial in addressing the challenges the site faces—such as climate change, loss of identity, and the need for festival space. By blending design with local involvement, the space can evolve into a place that not only functions well but also resonates deeply with the community.



元通清明会河坝

Fig5.2: People use the natural gravel land to set up fair stalls

Source: image found via Baidu Image Search

5.2.2 The Production of Space

The Production of Space (Lefebvre, 1991) suggests that space can be understood as a combination of the "first space" (physical space), the "second space" (mental space), and the "third space" (social space).

First Space / Physical Space :

First Space refers to the physical, material aspects of space—the built environment and its structural elements. This includes the design of infrastructure, buildings, and landscapes that shape the site's functionality and aesthetic. In the context of my project, physical space includes climate-adaptive water management systems, such as flood control measures and water level regulation, that ensure the space's resilience to environmental challenges. This foundation supports public activities, protects ecological balance, and addresses climate change impacts, creating a stable environment for interaction and use.

Second Space / Perceived Space :

Second Space represents how space is perceived and understood through cultural, historical, and emotional lenses. It involves the collective memory and the symbolic meanings attributed to a place. Perceived space is essential in forming the "identity of place"—the sense of belonging and connection that individuals or communities develop with a location. In this design framework, perceived space is cultivated by interpreting the site's history, cultural significance, and local symbols through design elements. These elements serve to reinforce the community's recognition of the space and their emotional attachment to it, thus contributing to the establishment of a unique and meaningful place identity.

Third Space / Lived Space :

Third Space refers to the lived experience of space—the social and interactive dimension where meaning is accumulated through everyday use and human interaction (Fig 5.2). This is where people engage with the space, form social bonds, and create shared memories, often through community events and festivals. In my design, lived space is reflected in the design of flexible and interactive spaces that encourage social participation, such as festival grounds and communal gathering areas. These spaces

are not merely functional; they enable individuals to interact, express their cultural practices, and build collective identity through social interactions. Over time, through repeated use, these spaces accumulate layers of meaning and become deeply embedded in the community's sense of identity and history.

Integrating the three spaces in design

In this project, First Space is represented by the physical infrastructure—such as the festival spaces and climate-adaptive water management systems—which provide a functional and experiential foundation. This space is not just a backdrop for activities but actively shapes the experience of the site. Second Space is reflected in how the design captures the emotional and cultural essence of the place, shaping the "identity of place" through symbolic elements and meaningful connections with the environment. This space is designed to provoke a deeper emotional connection to the site through the landscape and the way it is experienced.

Third Space is manifested in the interactive, social aspects of the design. By fostering community engagement through events like festivals, the site transforms into a space of lived experience, where people can contribute to the space's evolving identity. It is through these social interactions that the space's identity deepens, and its cultural significance grows over time. By integrating these three spaces—Physical, Perceived, and Lived—my design framework aims to create a waterfront space that is not only functional but also rich in meaning, identity, and community engagement. These spaces are interconnected and must be designed holistically to ensure that the site serves both its physical purpose and its cultural and social roles.

5.2.3 Identity of place

The identity of place is a fundamental concept in landscape design, focusing on the creation of a distinct, meaningful, and recognizable environment that fosters a sense of belonging and connection. The identity of place is not just about the physical characteristics of the landscape, but also the emotional, historical, and cultural relationships that individuals or communities have with the space. According to Edward Relph, meaningful places are created through the active involvement of the people who live and work within them, suggesting that place identity emerges through a dynamic, lived experience rather than solely through design intentions (Swaffield, 2022, p. 74).

The identity of a place is formed through its unique combination of history, culture, and the experiences of those who inhabit it. According to Osborne (2001), Place identity is about the narratives embedded in the landscape—the stories of past events, the recognition of historical significance, and the cultural symbols that are used to anchor the community's connection to that site. For example, the use of local materials, historical architecture, or cultural practices can all contribute to a landscape's identity. Furthermore, the emotional responses of people to a space, as shaped by sensory experiences (such as sight, sound, and touch), also contribute to the formation of place identity.

In the context of my design, the identity of place is an essential theme. The waterfront space is designed not only to address physical needs but also to create a sense of belonging and recognition. This is done by integrating cultural symbols, local heritage, and community values into the landscape, ensuring that the site reflects the history and identity of its people. By focusing on perceived space—how the landscape is understood and experienced emotionally and culturally—the design aims to reinforce the sense of identity and connection to the place, creating an environment that feels familiar, rooted, and meaningful to the community.



Fig5.3: Parade on street

Source: image found via Baidu Image Search

5.2.4 Climate adaption

Climate adaptation refers to the strategies and design approaches that help landscapes and urban spaces adapt to the impacts of climate change, ensuring environmental, social, and economic resilience. This includes measures that mitigate the risks posed by extreme weather events (such as floods, heatwaves, and storms) and enhance the long-term sustainability of a site in the face of shifting climatic conditions. Climate adaptation in landscape architecture goes beyond simply responding to immediate environmental challenges; it involves a proactive approach to creating spaces that can withstand and thrive amidst changing environmental conditions. For a waterfront site, climate adaptation is especially crucial, as the site may face challenges such as rising sea levels, storm surges, flooding, or drought. Adapting to these challenges requires designing spaces that are flexible and responsive to the evolving needs of the environment. Some of the strategies for climate adaptation that can be incorporated into the design include:

Flood control and water management:

Sealed surfaces exacerbate flood risk due to reduced infiltration and consequent enhanced rainwater runoff (Gill, Handley, Ennos, & Pauleit, 2007). Implementing adaptive water management systems, such as permeable surfaces, swales, and wetlands, can help manage floodwaters, reduce runoff, and improve water quality. This helps protect both the natural environment and the human inhabitants of the space.

Vegetation and ecological restoration:

Selecting native plant species that are resilient to drought or excess moisture can strengthen the ecological health of the site while promoting biodiversity. The native species tend to be accepted as the most suitable plants for use when aiming at achieving the most sustainable planting, as they are often highly pre-adapted to local climates with the assumption that they have been sourced from comparable biomass as in urban settings (Alizadeh & Hitchmough, 2019). According to Williams (1999), restoring ecosystems through reforestation or wetland restoration can also buffer against climate impacts like erosion or flooding.

Reduce moisture evaporation:

According to Shashua-Bar, Pearlmutter, and Erell (2009), designing for cooling through tree canopy, green roofs, and water features can reduce the urban heat island effect, ensuring that spaces remain comfortable even during periods of extreme heat.

Flexible and adaptive infrastructure:

The design of amphibious and floating public spaces allows for spaces with a high degree of adaptability compared to traditional ones (Dal Cin, Hooimeijer, & Matos Silva, 2021). Infrastructure such as walkways, bridges, and recreational spaces can be designed to adapt to fluctuating water levels or shifting environmental conditions. This might include elevated structures or movable features that can respond to changing tides or flood risks.

Room for the river:

The Room for the River Program is currently being implemented in the Dutch Rhine River Basin. According to Zevenbergen et al. (2013), this program aims to reduce flood risk and improve spatial quality by creating more space for the river. The authors summarize that one of the preconditions for the success of the program is providing room for rivers in a strict physical sense, which involves available space to expand a floodplain by setting back dikes or diverting water into a bypass area. The presence of dense urban communities or critical infrastructure may limit the ability to expand a river floodway because relocating these elements could be cost-prohibitive or socially unacceptable, which calls for adopting a river basin system approach.

Integrating climate adaptation strategies into the design framework of the waterfront site ensures that it can continue to function effectively in the face of environmental change. This approach not only helps to protect the site but also fosters a sense of security and stability for the community that relies on it, contributing to the overall identity of place. By addressing both immediate environmental challenges and future uncertainties, climate adaptation strategies help create a resilient, sustainable, and adaptable landscape that stands the test of time.

5.3 Design approach

This research combines "Top-Down Form Design" and "Bottom-Up Usage Accumulation" within the framework of space production theory to create a meaningful waterfront space that meets functional requirements while forming a unique identity of place.

For the "Top-Down Form Design" aspect, this research utilized a morphological approach. This approach focuses on the physical layout and structure of the space, ensuring that it accommodates climate-adaptive water management and supports the functionality of community events. It involves designing the spatial form to enhance environmental resilience and create visually and experientially rich spaces.

For the "Bottom-Up Usage Accumulation" component, this research applied the pattern language approach. This method focuses on identifying and reinforcing the patterns of local use and interaction that emerge organically from the community. By observing how people engage with the space over time, I aim to design spaces that encourage social interaction, foster community bonding, and strengthen the emotional connection to the place, ensuring that the space evolves naturally and meaningfully in response to the needs and experiences of its users.

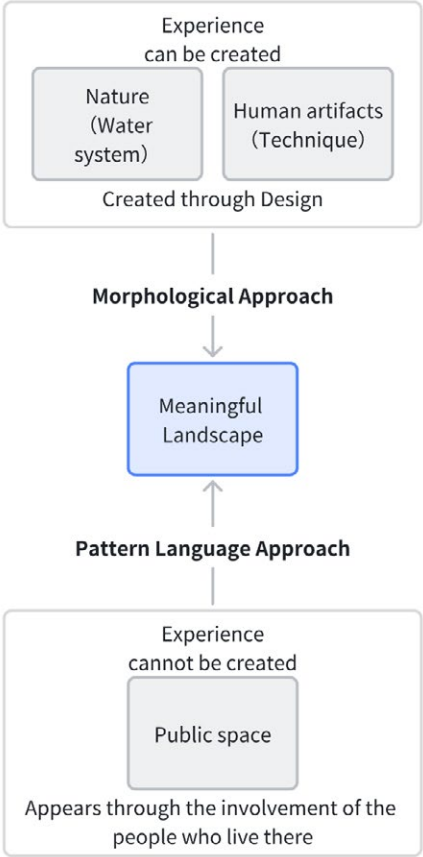


Fig5.4: Design approaches

5.3.1 Morphological approach

The term "morphology" was originally introduced by the German polymath Johann Wolfgang von Goethe (1749–1832) (Marshall & Çalışkan, 2011), who described it as "a science dealing with the very essences of forms" (Bullock et al., 1988). According to Jiaxiu Cai, initially applied in biology, the concept of morphology later expanded to various disciplines, including geography and linguistics. In geography, morphology refers to the form and transformation of landscapes, while in linguistics, it pertains to the elements and structure of language (Cai, 2018).

According to Jiaxiu Cai, in the context of the built environment, the concept of morphology emerged in the early 19th century and evolved into the field of urban morphology. Urban morphology is the study of the form and structure of cities, focusing on the arrangement of physical elements, such as streets, buildings, open spaces, and infrastructure, and how they evolve over time. It emphasizes the interrelationship between the physical environment and social behaviors, exploring how urban forms can influence or be influenced by human activities (Cai, 2018).

The morphological approach in landscape and urban design involves understanding and analyzing the spatial configurations, patterns, and typologies of a site, as well as the historical, cultural, and functional processes that have shaped these forms. This approach seeks to preserve and enhance the essence of a place by respecting its existing structure while introducing interventions that strengthen its identity and functionality. By recognizing the inherent qualities of a site and its historical context, the morphological approach ensures that design proposals integrate harmoniously with their surroundings, fostering a sense of continuity and place.

In this research, the morphological approach guides the physical design of the waterfront space by analyzing the existing urban and natural structures, allowing for a thoughtful intervention that respects the site's historical and environmental context. Through this approach, the form of the landscape is shaped to meet both functional needs and aesthetic aspirations, contributing to the creation of a meaningful and resilient public space.

5.3.2 Pattern language

Pattern Language, introduced by Christopher Alexander, provides simple, conveniently formatted, humanist solutions to complex design problems ranging in scale from urban planning through to interior design (Alexander, 1977). A pattern language, as Alexander proposed, serves as a system for understanding and creating physical urban forms that relate directly to human activities and social interactions. This language allows designers to organize spatial and non-spatial data into a format that enables a comprehensive understanding of how spaces function, both individually and as part of a larger system.

Patterns in the Urban Design field

A pattern in urban design can refer to a variety of things, such as a person, a social entity, an event, or a type of physical space or activity. For example, a "hairstylist" is not just a profession but a social entity that uses urban space to reform urban systems by bridging the private and public domains, fostering community interactions. Similarly, a "clinic" serves as a social entity focused on public welfare, while a "stair" is a physical element that is defined not just by its morphology but by its function in facilitating movement and shaping daily human activities (Alexander, 1977). These patterns can be used to understand how spaces and social systems are intertwined, allowing for more thoughtful and cohesive urban design (Cai, 2018).

This framework is a powerful tool for organizing and interpreting the spatial and social dynamics of a city, ensuring that design decisions are rooted in an understanding of both the physical environment and the human activities that shape it. Through pattern language, urban design can create spaces that are not only functional but also foster social interaction, cultural identity, and a sense of belonging.

Patterns in the Landscape Architecture field

In landscape architecture, the concept of patterns extends to the repeated relationships found in cultural, economic, and ecological processes in a particular region. These recurring relationships, often referred to as signature-based design, help define a place by emphasizing its distinct ecological and cultural traits. By identifying these patterns, designers can better understand the characteristics of a region, create designs that reflect local

identities, and foster deeper human connections to the land. For instance, the placement of trees along irrigation channels or streams in semi-arid regions, or the characteristic grids of pecan trees in the Deep South, are patterns that reflect both natural processes and human interventions. These patterns carry cultural significance, as they are embedded with the history and identity of a place. They become signatures of a region, recognizable to those familiar with the area, and their absence can be deeply felt (Swaffield, 2002, P214).

Signature-based design is a process of understanding these ecological, cultural, and economic relationships and applying them thoughtfully to design. This approach emphasizes the importance of recognizing and respecting the historical and environmental context in order to create designs that are both functional and meaningful. It is not just about the physical elements, such as vegetation, soils, water, and landforms, but about understanding how these elements interconnect and shape the experience of a place. The patterns found in nature, like the rocky slopes of the Front Range in Colorado or the blooming perennial flowers in rock crevices, convey a sense of place and continuity, fostering a deeper sense of connection to the environment.(Swaffield, 2002, P214). By applying these patterns in landscape architecture, designers can create spaces that are not only aesthetically pleasing but also culturally and ecologically rooted in their context. This approach helps cultivate a sense of identity and attachment, contributing to the creation of meaningful and enduring landscapes.

Both in urban design and landscape architecture, patterns play a crucial role in shaping the form and experience of spaces. Whether through a pattern language that integrates spatial and social elements or through signature-based design that reflects the ecological and cultural identity of a region, patterns guide the design process and help create spaces that are not only functional but also meaningful. Understanding and applying these patterns allow designers to create environments that resonate with people, fostering a sense of belonging and connection to the places they inhabit.the characteristics of a region, create designs that reflect local identities, and foster deeper human connections to the land.

5.4 Research structure

In order to build the perceivable identity of the site, the research process follows a structured approach that integrates both top-down and bottom-up methodologies. The approach is divided into distinct steps, each focusing on a different scale of analysis and design, with the goal of creating a meaningful and functional landscape that is both historically informed and contextually relevant.

Step 1: Understanding the site through Landscape Biography

The first step in the research structure involves gaining a comprehensive understanding of the site by reviewing its historical context. Using the method of Landscape Biography, I focus on the history of Traditional Water Management Techniques and the history of the Yuantong Xi River. This step involves extracting significant historical elements that have shaped the landscape, with particular attention given to those features that are valuable in forming the identity of the place. This phase is conducted at both the water district scale and the regional scale, as the historical influences on the site are broad and multi-layered.

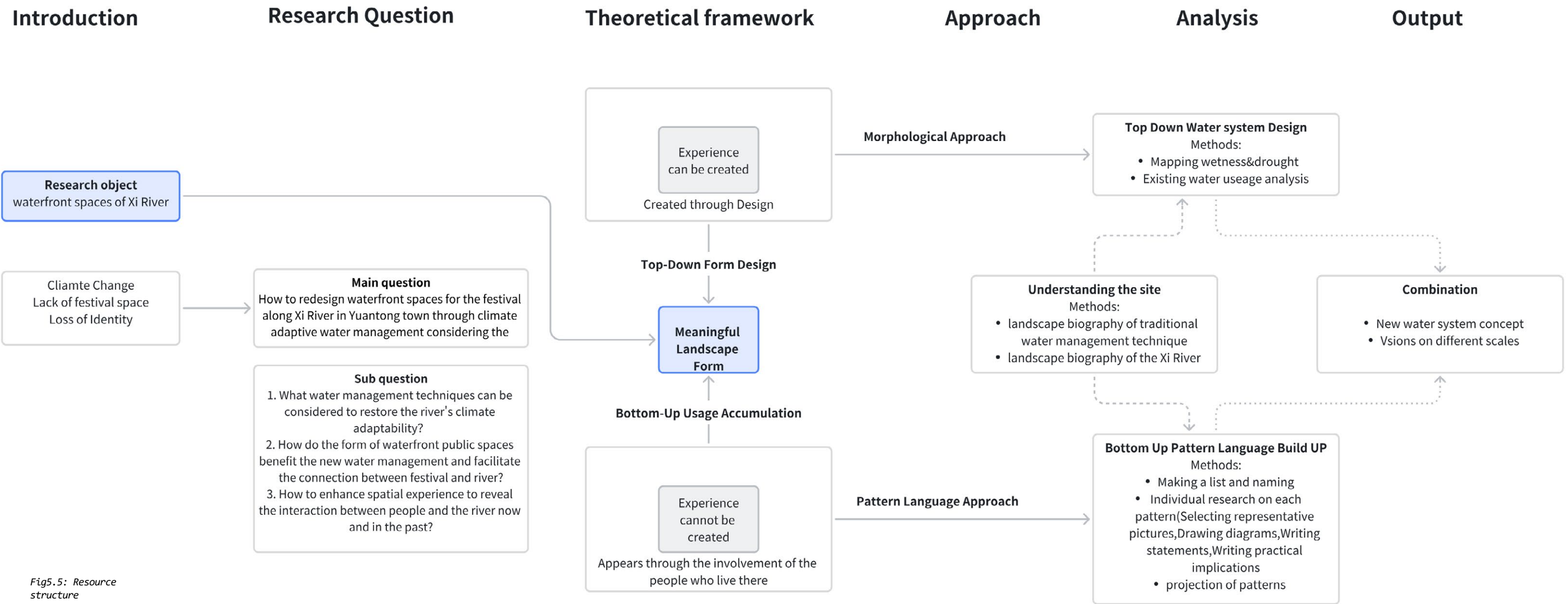


Fig5.5: Resource structure

Step 2: Analyzing the site using the Morphological Approach

The second step uses the Morphological Approach for a top-down analysis of the physical and spatial structures of the site. This includes mapping wetness & drought patterns and conducting a water usage analysis, which helps in understanding how water is managed and distributed across the landscape. The morphological analysis looks at the form, structure, and transformation of the site, helping identify the spatial relationships that define the landscape's current state. This step is conducted at the water district scale and regional scale, as both scales provide insights into the broader and more localized aspects of water management.

Step 3: Analyzing local usage through the Pattern Language Approach

The third step runs concurrently with the second and focuses on the bottom-up approach. This involves analyzing how local people interact with and use the space through the Pattern Language Approach. This methodology emphasizes the everyday use and cultural meanings that emerge through human interaction with the environment. To construct the pattern system, I employ the following methods:

Making a list and naming: Identifying key elements and behaviors that form the patterns of use.

Individual research on each pattern: Conducting in-depth analysis of each identified pattern to understand its significance in the local context.

Pattern projection: Projecting these patterns into the design process to inform the spatial organization and cultural continuity of the landscape.

This bottom-up analysis is conducted at both the water district scale and the regional scale, providing insight into the social and cultural dynamics that influence the use of water and space.

Step 4: Integrating the Morphological Approach and the Pattern Language Approach

The final step integrates the top-down Morphological Approach and the bottom-up Pattern Language Approach to develop a comprehensive, multi-layered design strategy. This step synthesizes the structural and functional elements of the landscape (from the morphological analysis) with the local, cultural, and social practices (from the pattern language analysis). The integration occurs at two scales: the regional scale and the market town scale, allowing for a holistic design vision that incorporates both physical form and human use.

Expected outcomes:

A new water system concept that integrates both historical techniques and modern needs, informed by both morphological and pattern-based analyses.

Visions on different scales, from the regional scale to the market town scale, that present a coherent strategy for water management and spatial design that respects both environmental and cultural contexts.

This research structure combines historical, morphological, and social perspectives, allowing for a nuanced and deeply contextual approach to the design of climate-resilient and culturally meaningful landscapes.

06

Site Analysis

6.1 Landscape biography

6.1.1 Landscape biography of the traditional water management technique

In 276 BCE, Li Bing and his son skillfully utilized the terrain to build the Dujiangyan irrigation system, a groundbreaking water management project. They divided the flow of the Min River into two main channels: the inner and outer rivers, and distributing it to different cities in the Chengdu Plain in different proportions during the dry and flood seasons (Fig 6.1).

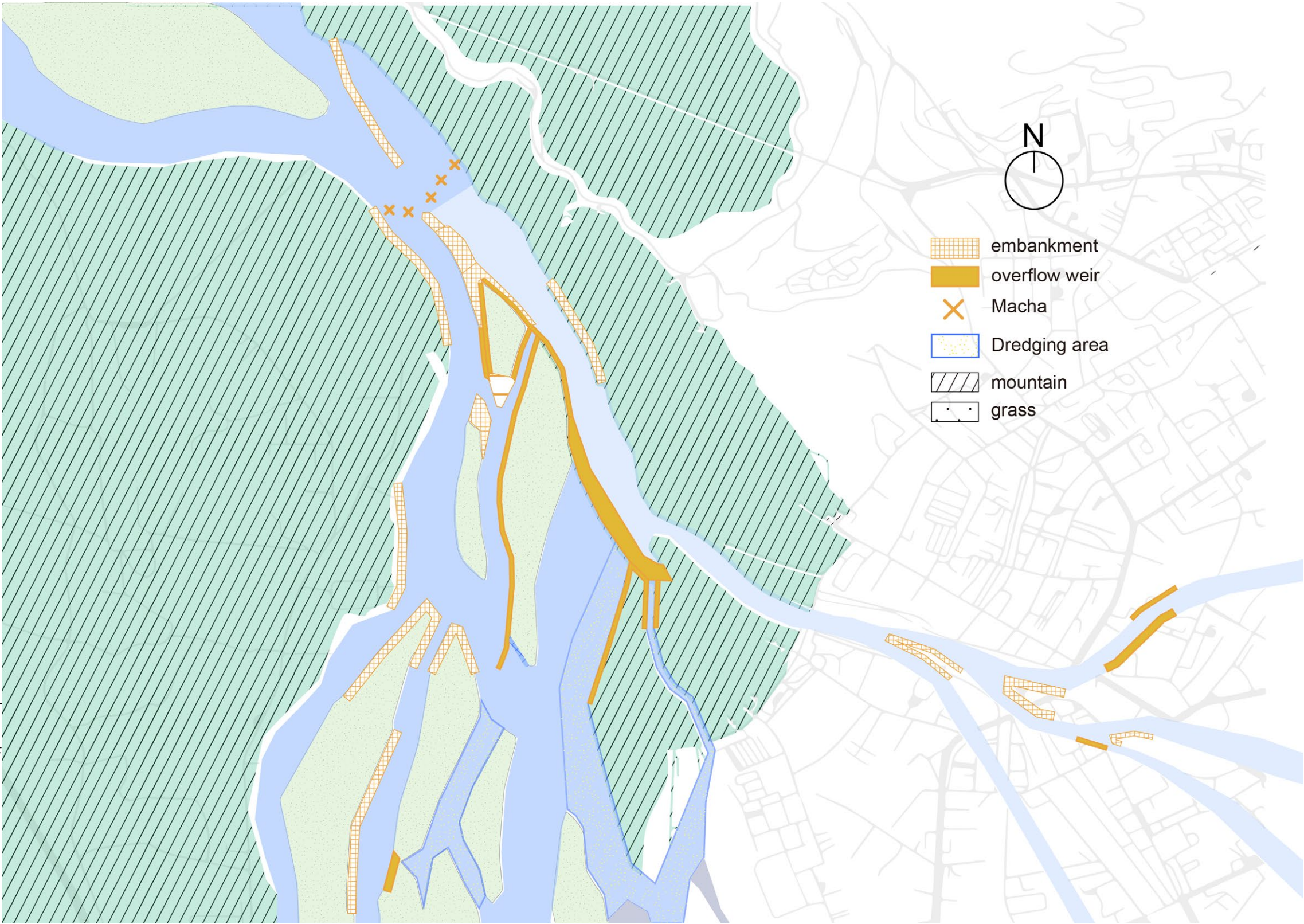


Fig 6.1: Head project of the Dujiangyan irrigation system and Water Rules

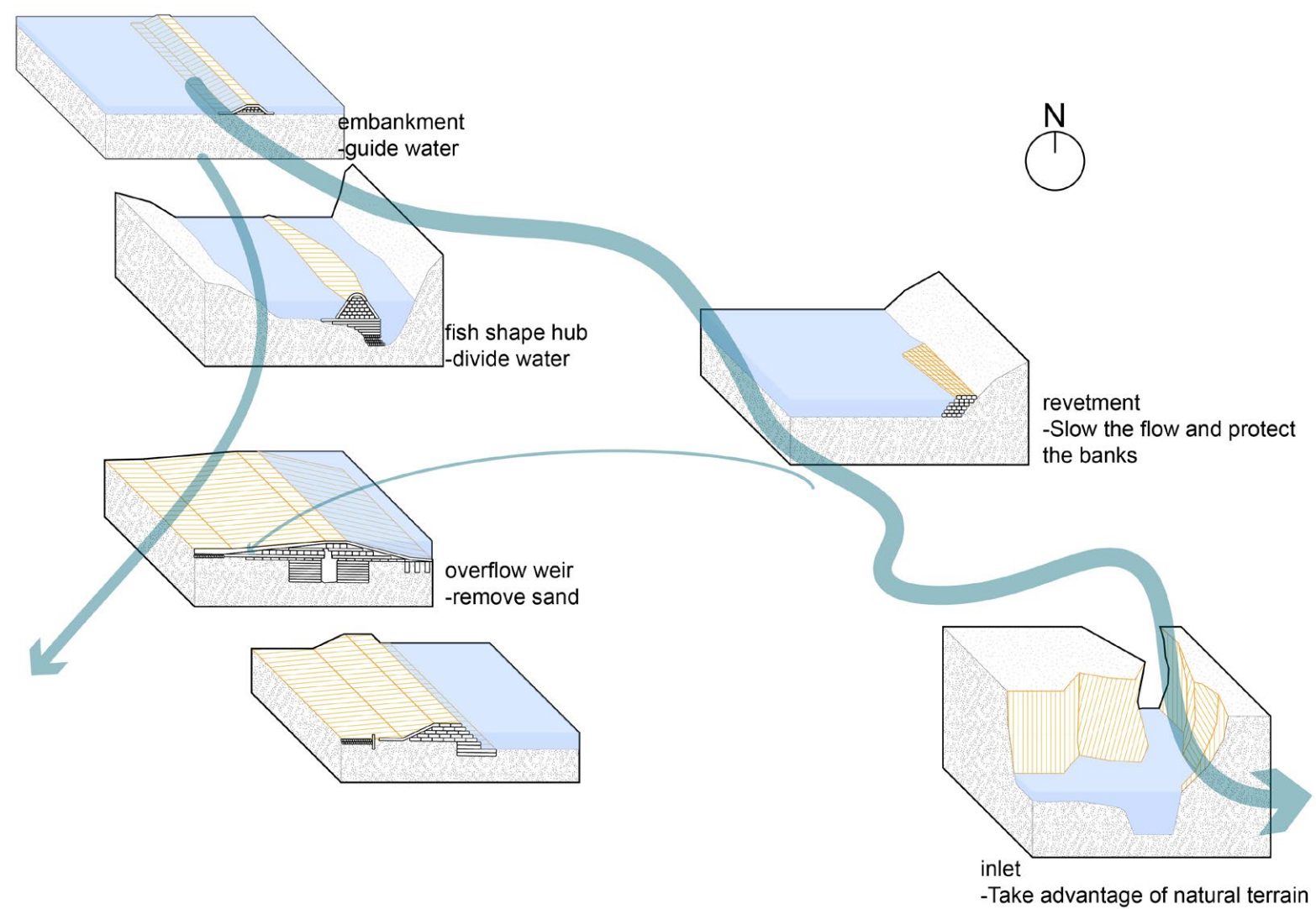


Fig 6.2: Water management of the Dujiangyan irrigation system during dry season

According to Tan (2009), Li Bing created different forms of weirs and embankments according to the terrain and distributed water according to population density. During the spring rice planting period, 60% of the water will flow into the inner river to the metropolitan area, and 40% of the water will flow into the outer river to the direction of Yuantong Town, where the population density is lower (Fig 6.2).

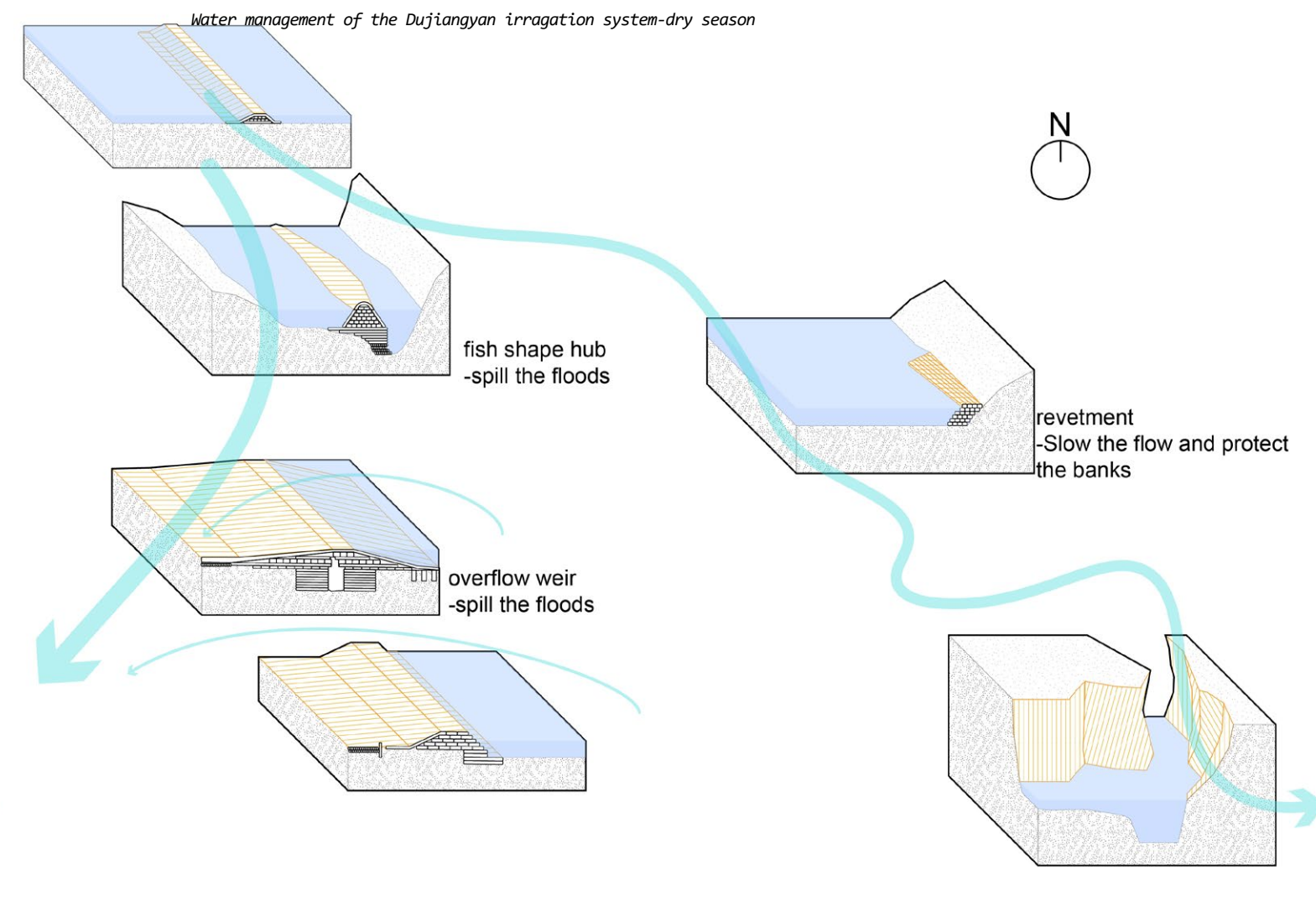
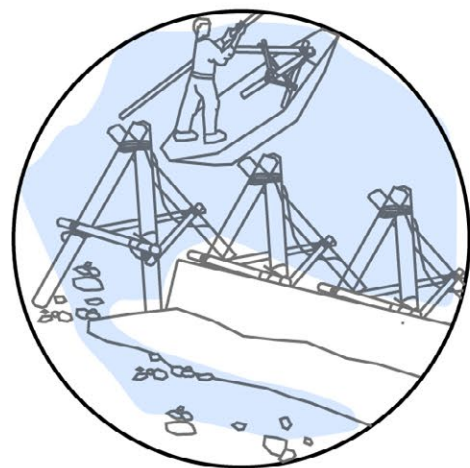


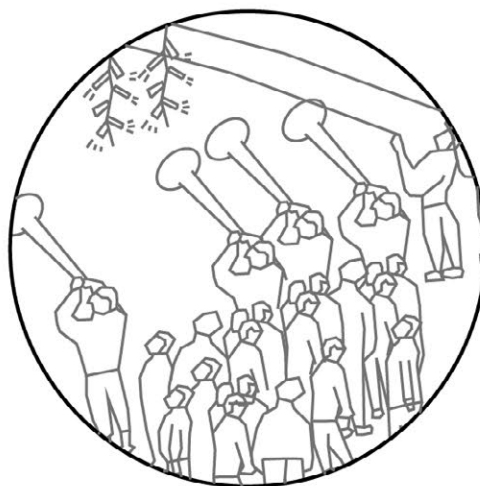
Fig 6.3: Water management of the Dujiangyan irrigation system during flood season

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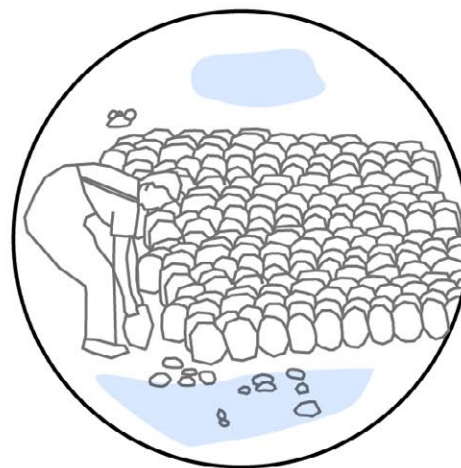
During the flood season in summer, the situation reversed. 60% of the water will flow into the outer river, which undertake the function of flood discharge (Fig 6.3).



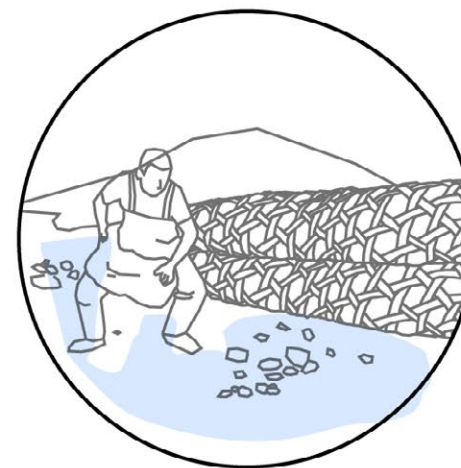
Build temporary water retaining structures



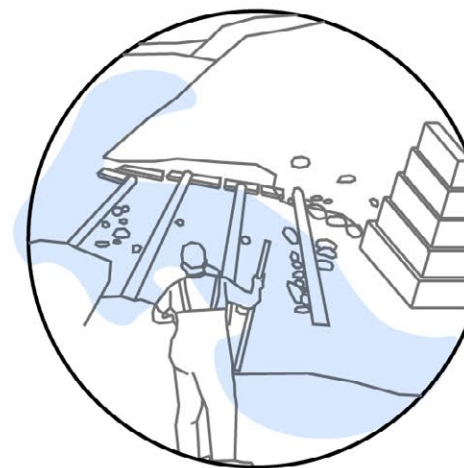
Celebrating



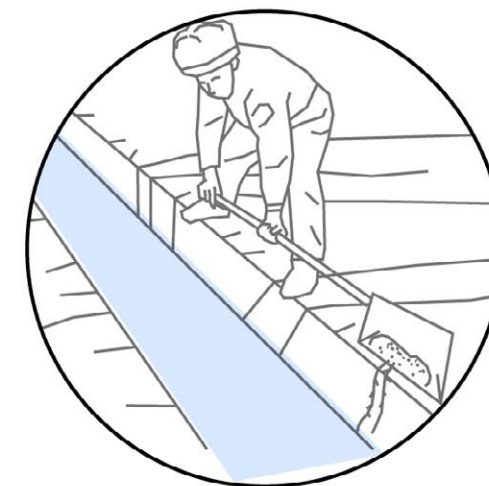
Rebuild Pebble Base



Rebuild Bamboo Cage Weir



Dredging River



Cleaning Ditch

According to Tan (2009), Li Bing established strict maintenance regulations for future generations. During the winter and spring low-water seasons each year, relevant authorities would arrange for workers to follow Li Bing's water management methods, implementing staged water diversions by periodically blocking and redirecting the river flow. Temporary embankments made of natural materials, such as bamboo baskets and wooden sluice gates, were constructed.

When repairing the Outer River, water would be diverted into the Inner River, and when repairing the Inner River, water would be diverted into the Outer River. This process also involved dredging and maintaining dikes and embankments (Fig 6.4).

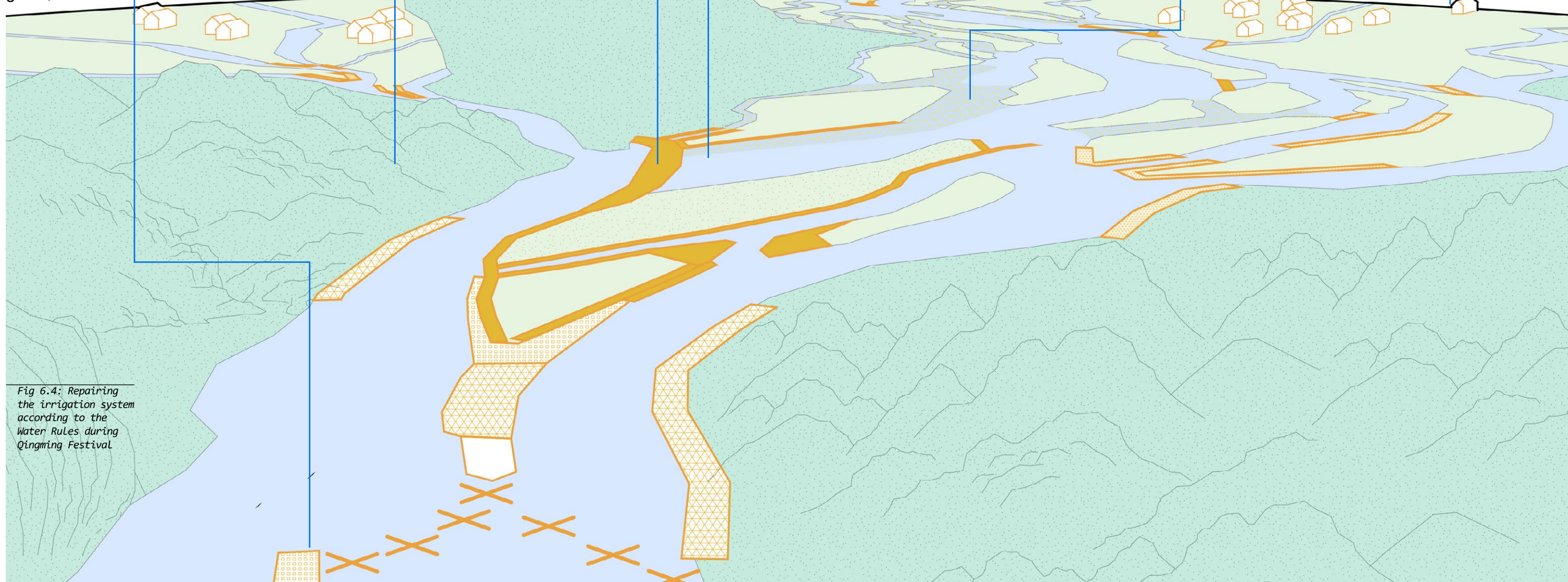


Fig 6.4: Repairing the irrigation system according to the Water Rules during Qingming Festival

6.1.2 Landscape biography of the river

276BC-1600 Settled along ditches

Landscape: At the local level, people follow the maintenance guidelines of the Dujiangyan irrigation system and only use weirs, embankments, ditches of different heights, and natural gullies to divert and guide water. According to Fang (2012), based on the study of the historical structure and characteristics of villages in western Sichuan, it can be inferred that the settlement in Yuantong was located along the main ditches, with limited connections between the banks of the river.



weir



old ditch

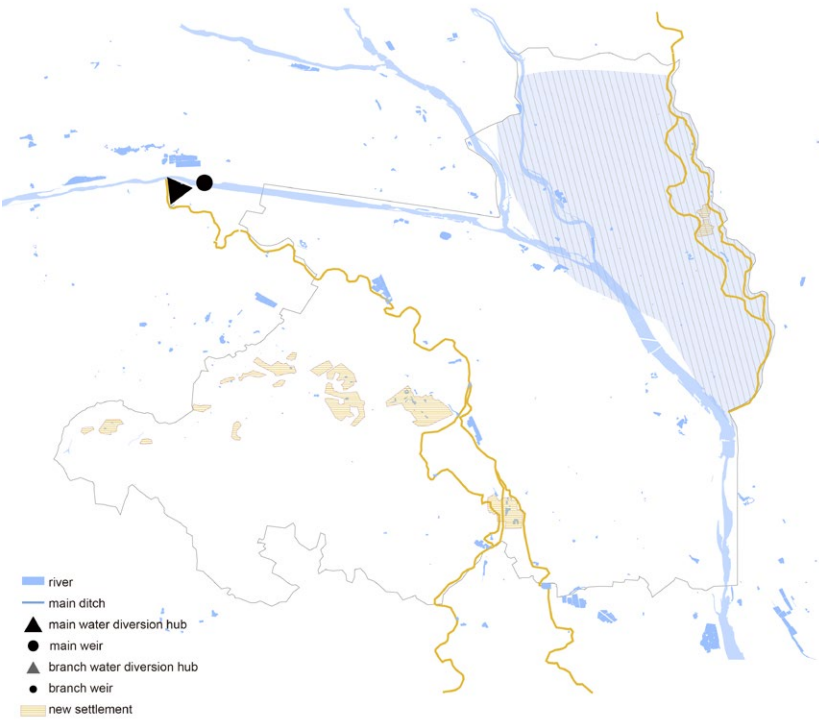
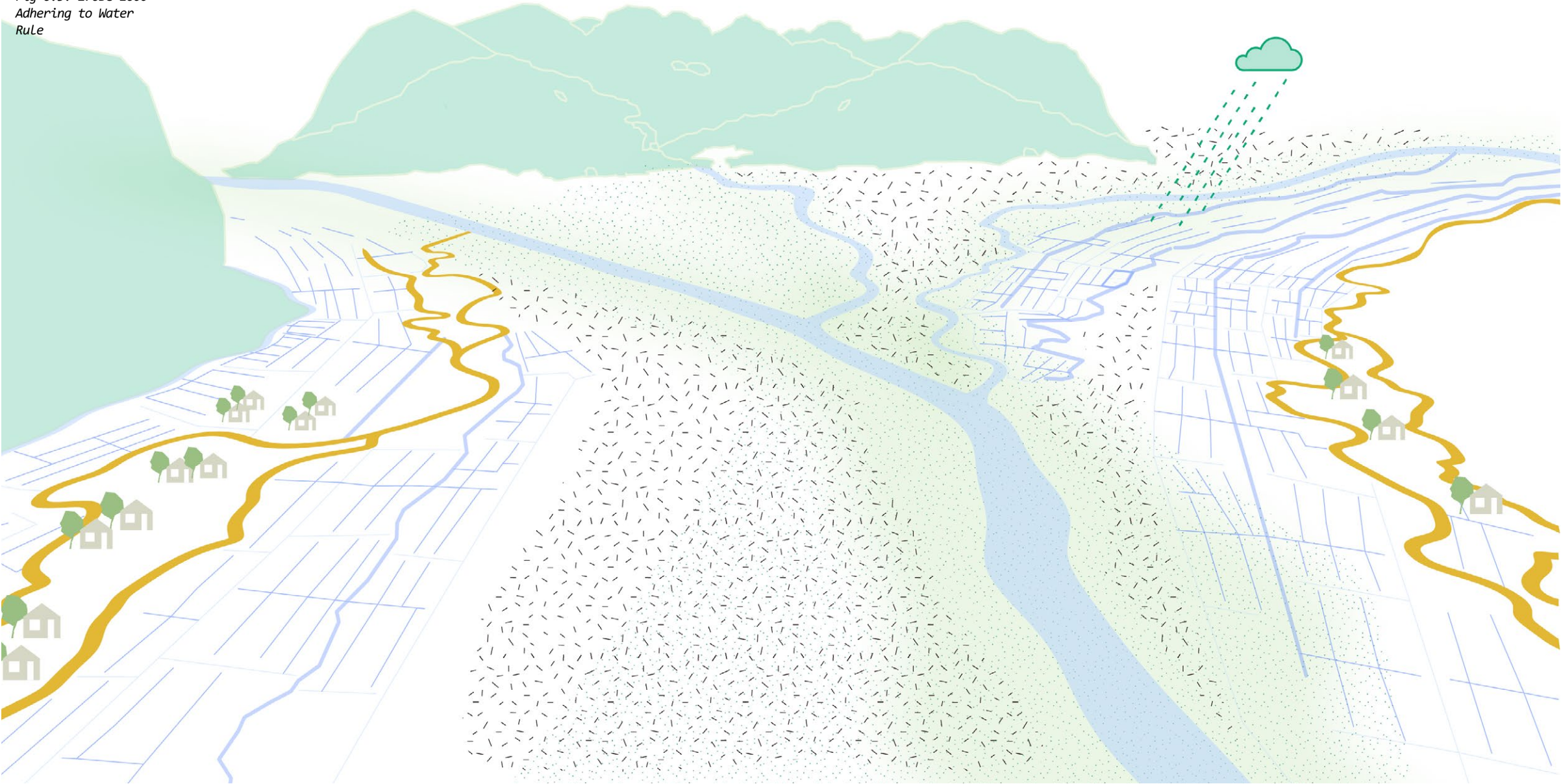


Fig 6.5: 276BC-1600
Adhering to Water
Rule



According to Tan (2009), due to the influence of Li Bing and his son's water management ideas, people developed a unique form of nature worship. Li Bing temples were built in many places and also served for ditch repair management during the festival. People engage in small-scale dredging activities at specific locations to prevent channel blockage (Fig 6.5).

1600-1780 Big immigration-live with water

Landscape:According to Jiang (2022), due to continuous wars, the Chengdu Plain suffered significant losses. To repopulate the region, the government implemented an immigration policy to encourage residents from other provinces to migrate to Chengdu. According to Fang (2012), these immigrants had different living habits and preferred to live along the mountains and rivers. Some merchants occupied the riverbank and built a market area, while others developed agriculture in the inland open space. They built



Linpan Village



Market Town



Bridge



Qingminghui

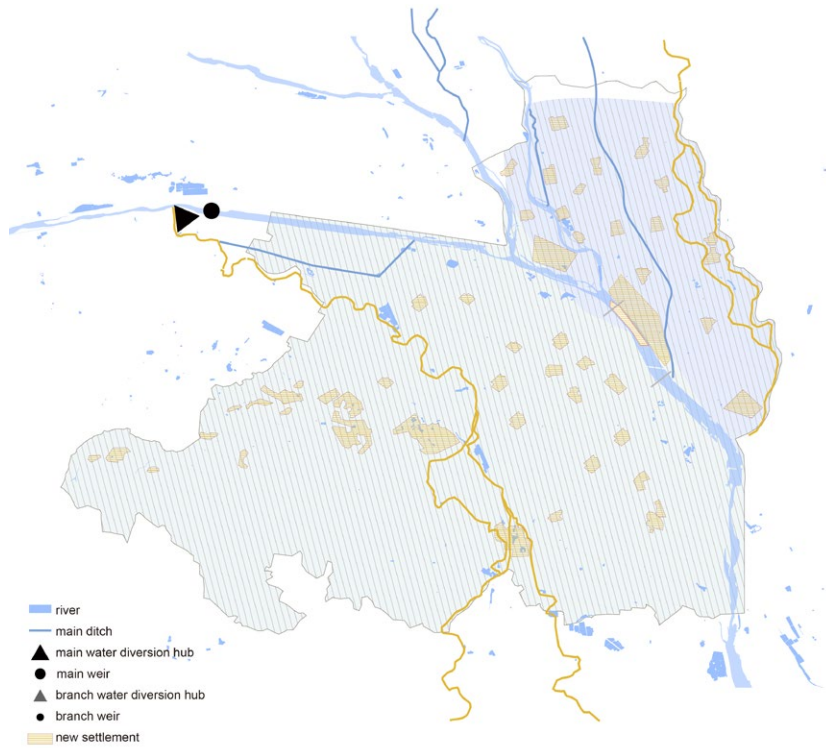
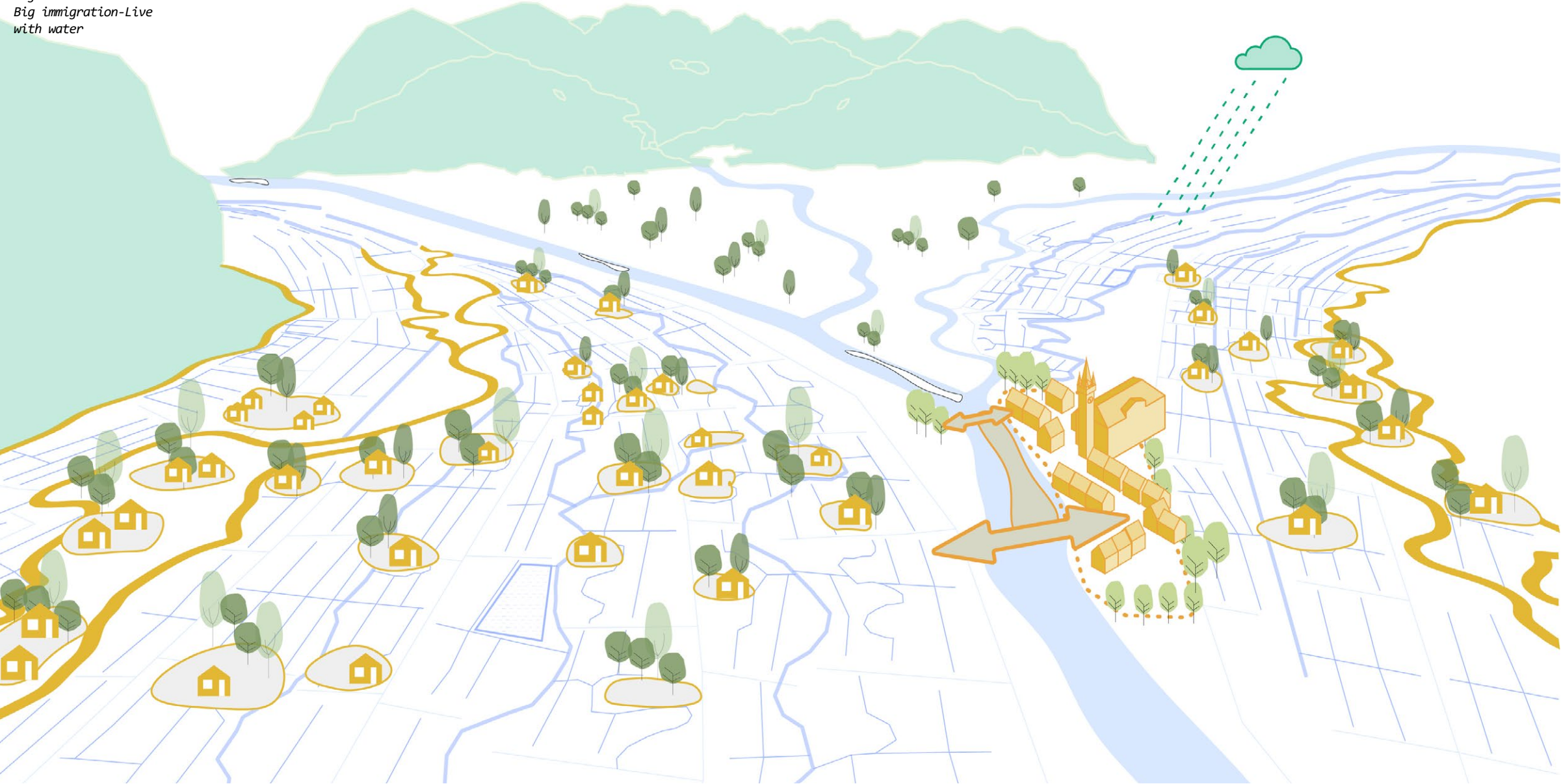


Fig 6.6: 1600-1780
Big immigration-Live
with water



curved ditches to form a "river landscape" around the village and planted bamboo clumps to create a "mountain-like barrier." The communication between the two sides of the river became frequent, and many bridges were built to strengthen the connection. People use the natural sediment in the middle of the water to hold a temporary market, trying to unite immigrants of different backgrounds and encourage them to help each other in farming.

Festival events:The "Qingminghui" as we know it today has started. Qingming Festival is no longer a repair project, but an event that mixed different attitudes toward water. The parade expresses natural worship. The market, performances, and banquets held in the village are the expression of immigrant culture with closeness to water (Fig 6.6).

276BC-1600 1950-2014 River as an infrastructure

Landscape: Urbanization has strained water use in the spring and the irrigation systems have been changed to water-saving forms. The ditches with natural shapes have been replaced with straight ones. Major canals have been dredged on a large scale for building materials and also for more efficient water transfer during dry seasons.



sluice&new Sanhe Weir



increasing tourists

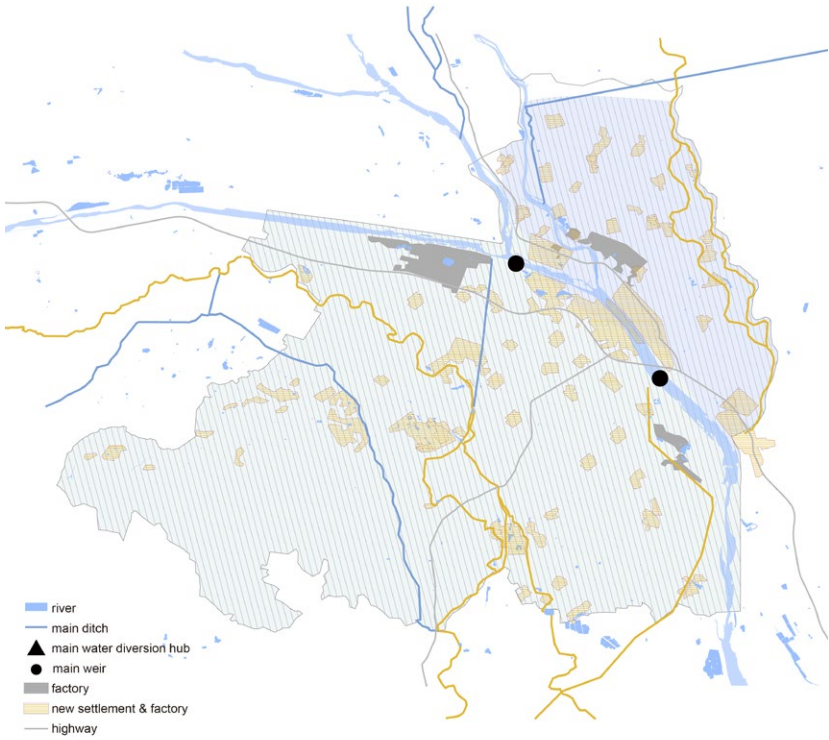
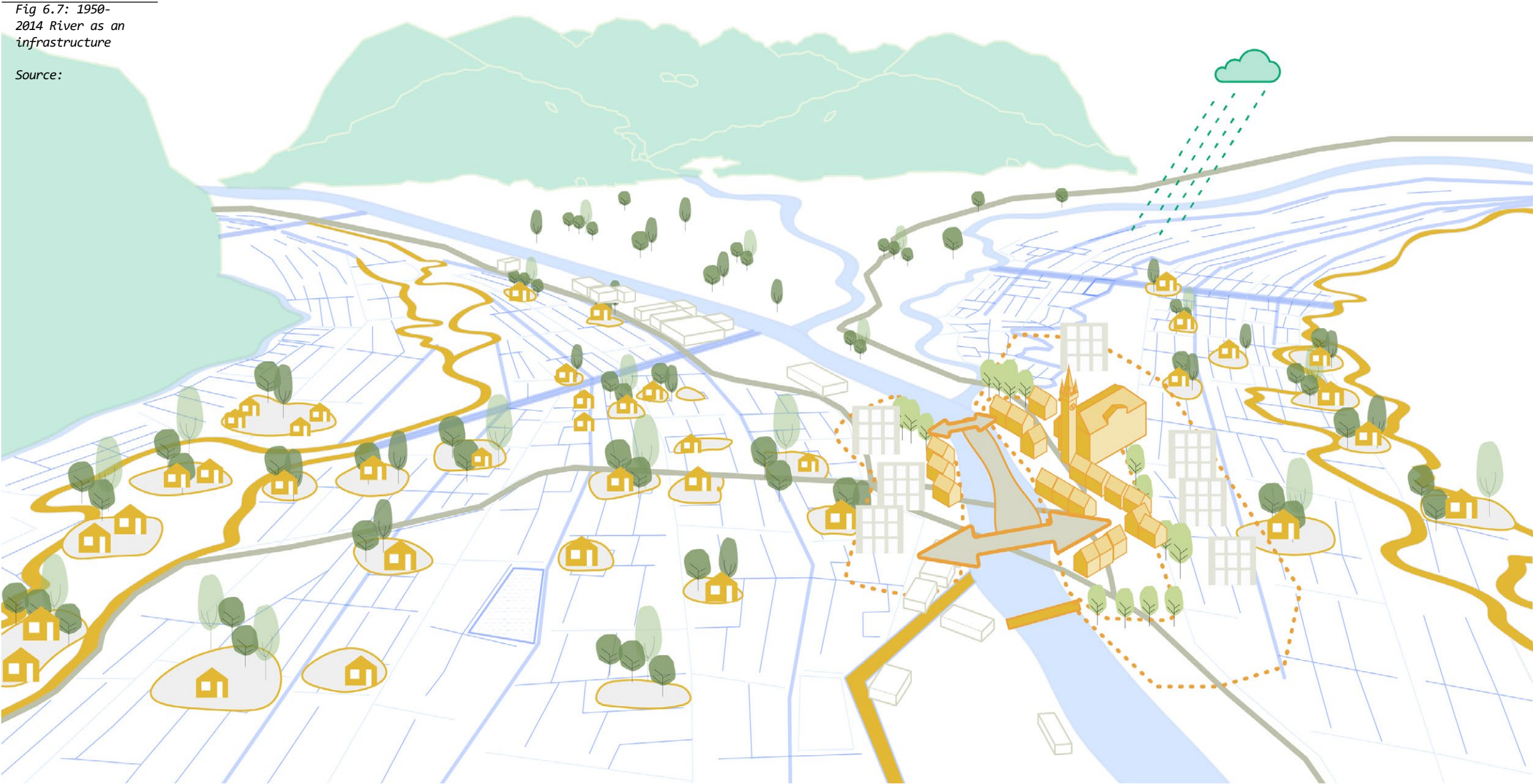


Fig 6.7: 1950-2014 River as an infrastructure
Source:



As one of the supplementary water sources of Dujiangyan Irrigation District, Xihe Irrigation District undertakes the task of delivering water to surrounding areas, that Dujiangyan Irrigation District cannot cover. Many new weirs and branch canals have been built in Yuantong Town, and a large number of factories have been established beside the riverbanks to process the sediment.

Festival events: he importance of the river as infrastructure increases. However, River as cultural landscapes is gradually neglected and dredging becomes more important than festive activities (Fig 6.7).

6.1.3 Conclusion

The traditional water management techniques, the old market town, and the modern infrastructure carry unique historical and cultural symbols, and form the identity of the place together. Traditional water management techniques, such as the bamboo cage weir, showcase the harmonious coexistence between humans and nature. This technology is one of the foundations of local culture, symbolizing the combination of wisdom and natural forces, and is an important marker of the local identity.

The form of the market town, and the festival reflect the gathering and interaction of society; these spaces for human activity are not only physical entities but also carriers of cultural exchange and identity. The continuity of these elements further reinforces Xi River's role as a cultural and social link.

The modern infrastructure, such as Sanhe Weir, reflects the future climate challenge, which should also be considered as part of the story telling.

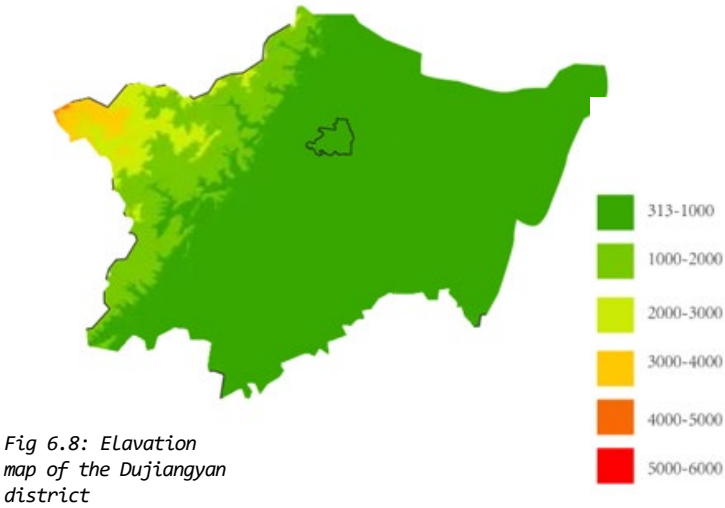
Through these elements, we can see the continuity and transformation of the site's identity, where water, technology, social activities, and nature together shape the uniqueness of this land.

6.2 Top down analysis of the water system

6.2.1 Mapping wetness and droughts

Elevation

Yuan tong town is located on the western edge of the Western Sichuan Plain in the middle and upper reaches of the Minjiang River in Sichuan Province. The terrain slopes from northwest to southeast, showing a trend of being high in the northwest and low in the southeast (Fig 6.8).

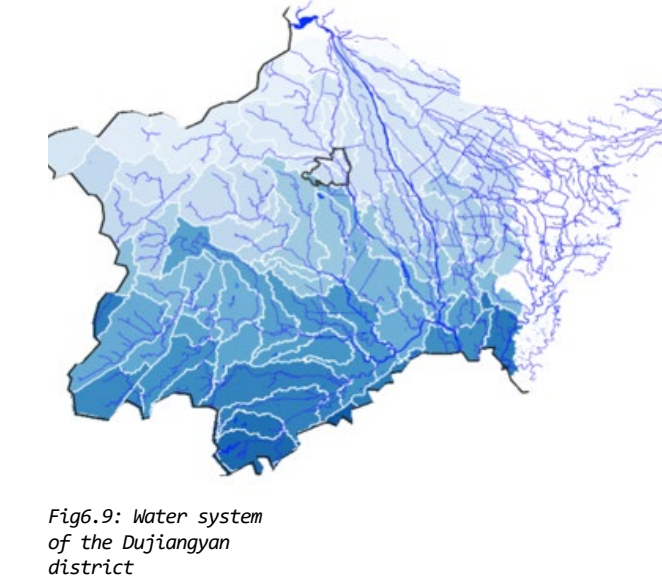


Reservoir

The runoff in the Xi River irrigation district is from the hilly area with sufficient precipitation, but the water storage facilities in the hilly area are limited, and its own drought resistance is poor.

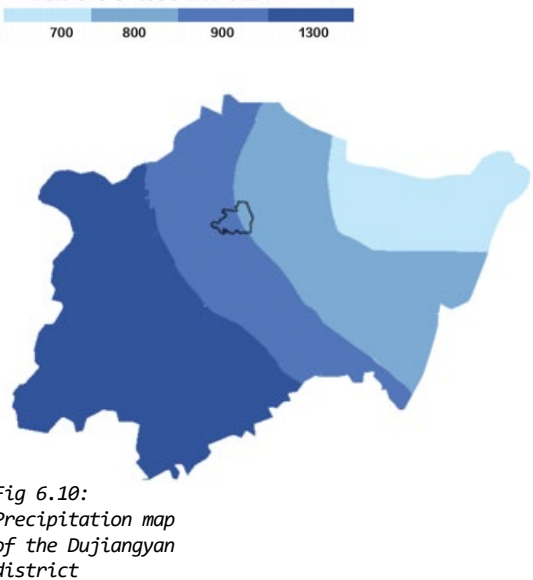
The Dujiangyan irrigation district also has few reservoirs, coupled with less rainfall, resulting in less water flow in Spring.

Existing systems focus on the efficiency of water transport, adopting the formalised ditch system with concrete, but neglect the efficiency of water utilization (Fig 6.9).



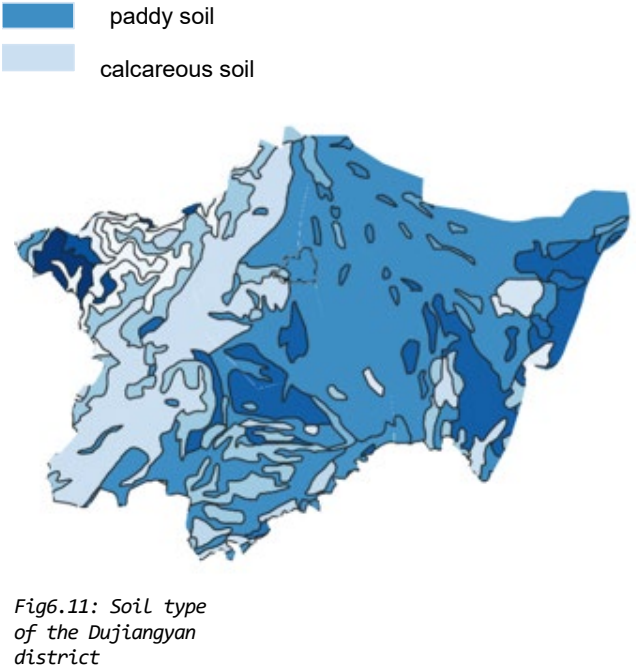
Precipitation

Due to the influence of natural climate change, the rainfall in the year is uneven, less rain in winter and spring, more rain in summer. The hilly area in the west has sufficient precipitation, and the precipitation is collected into surface runoff, which becomes the main water source of the Xi river district. The spring rice planting period in this area is the peak water use period, but the rainfall during this period is not enough to meet the water demand. Heavy rains are frequent from May to October, and the soil is often in a wet state during the rainy season, so the summer is mainly faced with floods and soil erosion (Fig 6.10).



Soil

The main soil type in the hilly area is calcareous soil with high sand content and low water retention capacity. Water holding capacity is provided only by vegetation. Because rice is planted all year round in the plain area, the soil is soft, rich in organic matter and has a high water retention capacity. However, due to the low vegetation coverage, the water evaporation rate is high (Fig 6.11).



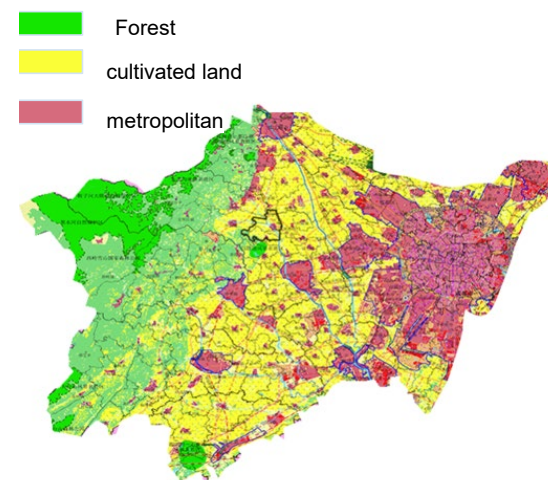


Fig 6.12: Landuse
of the Dujiangyan
district

Landuse

The water system in Yuantong area needs to transport water to surrounding cultivated land and the metropolitan area on the right in spring. The rational distribution of water is also one of the main contradictions of water use in this region(Fig 6.12).

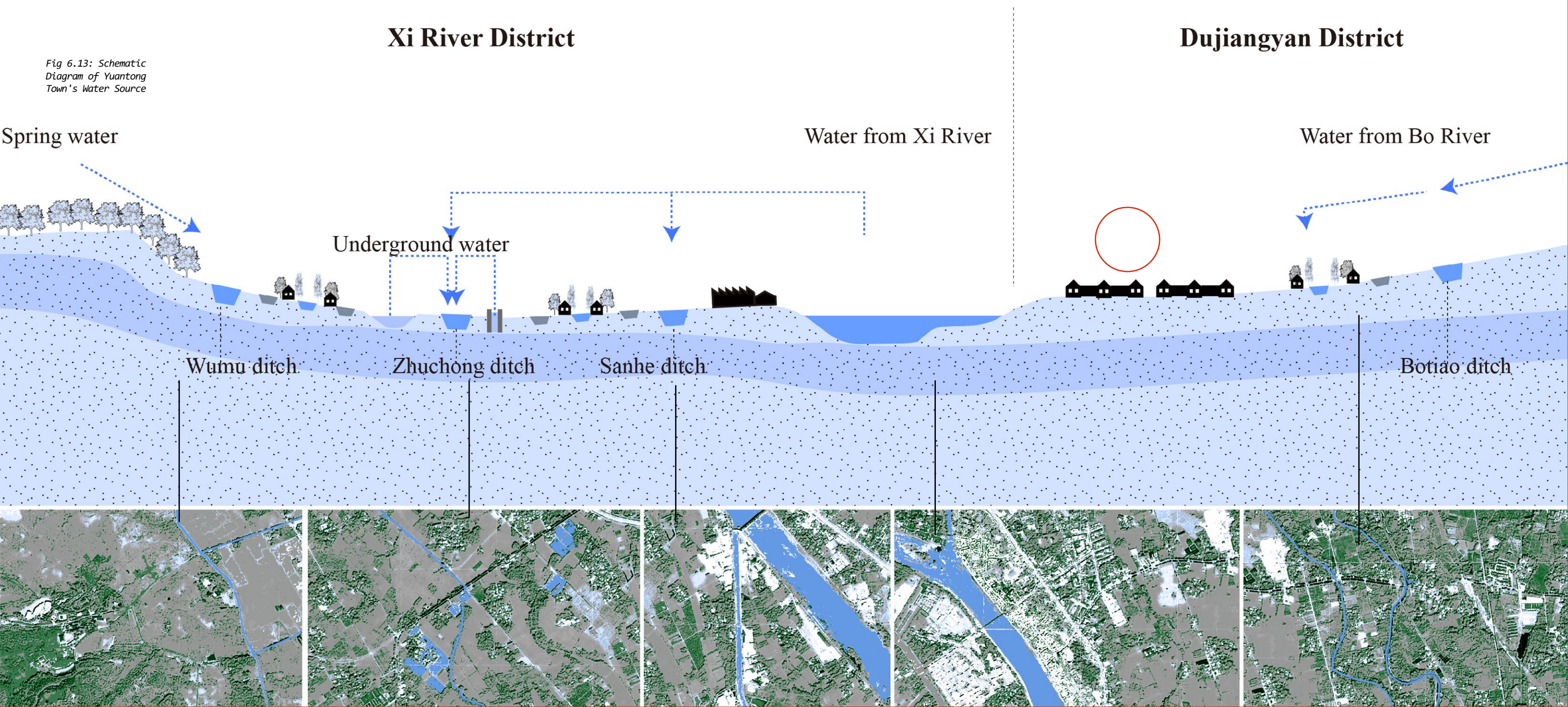
6.2.2 Existing water usage analysis

Water source

There are four main ditches here. In the Chinese context, both "堰" (weir) and "渠" (ditch) refer to water channels. All these water channels are used for water transport rather than flood discharge. The Wumu Weir, Renmin Weir, and Botiao Ditch transport water within the town, while the Sanhe Weir is built to deliver water downstream to other cities (Fig 6.13).

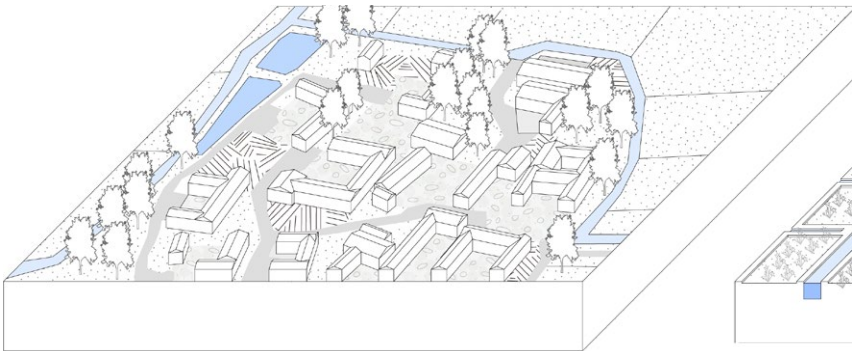
Drought concentrated in the middle of the left bank of the river. Because it is located at the end of the irrigation ditch, there is insufficient water all year round in spring. Locals coped with the drought by digging for groundwater in the lowlands.

Fig 6.13: Schematic Diagram of Yuantong Town's Water Source



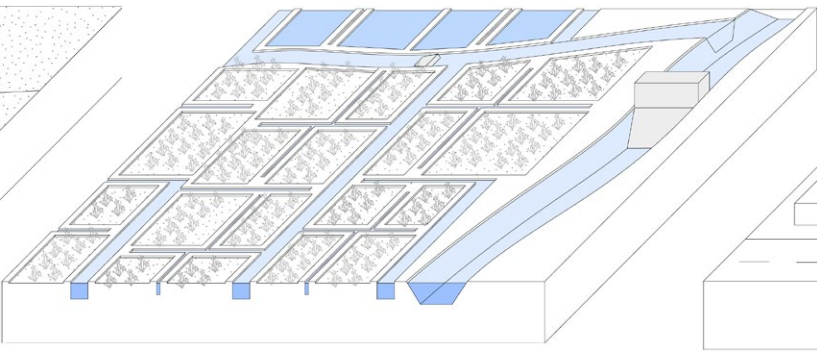
Drought-causing water useage

Village



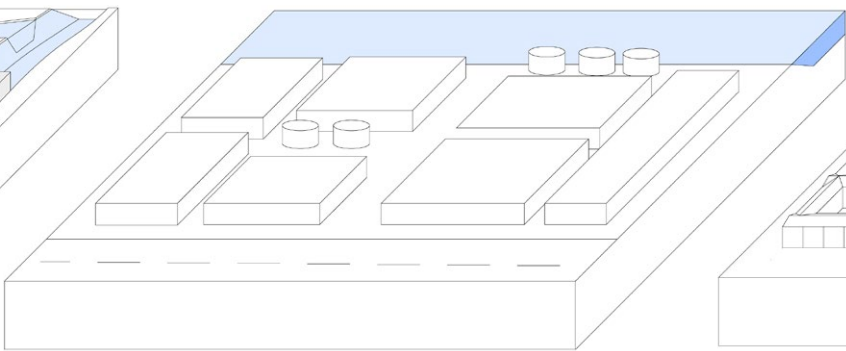
The village is often located next to the head ditch, where there is sufficient water resources, and it is far away from the river, so there is no danger of flooding in summer. Local people used to build curved ditches to form a "river landscape" around the village and planted bamboo clumps to create a "mountain-like barrier." There are reservoirs in the village to cope with the drought. shrubs and trees are planted on both sides of the head ditch and can purify the water after use.

Rice-rape crop rotation model



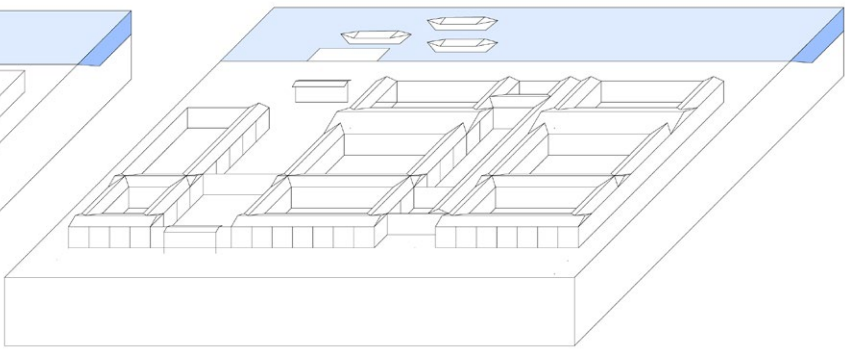
Farmland is the part that uses the most water. Yuantong area adopt the rice-rape crop rotation model. In the past, some rice field were used as water storage ponds in winter because they were in low-lying areas. However, due to population growth in modern era, all farmlands have been transformed into crop rotation fields. To grow rapeseed in the fall, the water stored in the summer paddy fields is drained after the harvest. The excess water in the paddy fields is not well utilized.

factory



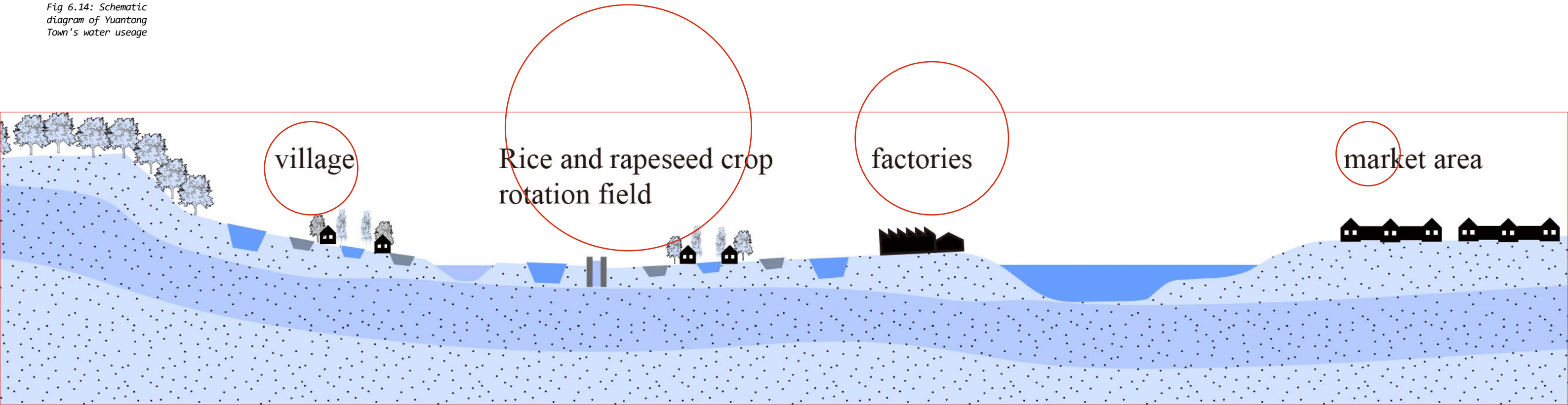
The factories by the lake depend on the sand and gravel in the Xi River for their building materials. The survival of the factory consumes a lot of water, and due to the frequent mining of sand and gravel, it has a bad impact on the environment.

Market area



The Market area is where Yuantong Ancient Town regularly holds fairs. In ancient times, due to the convenient water transportation, this place attracted a large number of merchants to settle here. A large number of ancient buildings are now well preserved. However, in modern times, due to the development of land transportation, the connection between the Market area and water gradually weakened.

Fig 6.14: Schematic diagram of Yuantong Town's water useage



6.2.3 Conclusion

As the main spring water source in Yuantong area, the hilly area has enough precipitation low water storage capacity and no adjustment capacity.

The plain cultivated area consumes a lot of water, but the vegetation density is low and the water loss is serious.

Existing systems focus on the efficiency of water transport, but neglect the water retention. The number of natural channel structures and cisterns should be increased to catch and store water during the rainy season to cope with drought in the spring.

In conclusion, a more sustainable water management is needed to address the increasing demand for water as well as the flooding issue.

6.3 Pattern language build-up

6.3.1 Research steps

Based on Jiaxiu Cai's method (Cai, 2018), pattern language research was developed in three steps :

- (1). Making a list and naming
- (2). In-depth Research on Each Pattern
- (3). Pattern Projection

These steps are not meant to be strictly linear or rigid. Researchers can reverse processes, revisit earlier steps, or start from different points based on specific design goals, integrating forms as well as spatial patterns throughout the analysis (Cai, 2018).

Fig 6.15: Pattern List

Climate change	Ditch	A1	Concrete ditch	L
		A2	Natural ditch	L
	Moisture Retention Planting	B1	Nursery	L
		B2	Seasonal Rice Field	L
		B3	Seasonal Rice-Aquaculture System	L
		B4	Storage filter	L
	Water Source	C1	Spring pit	L
		C2	On-farm reservoir	L
	Resilient Vegetation	D1	Local flora buffer	L
		D2	Forest	L
	Room for River	E1	Seasonal rapeseed field	M
		E2	Resettlement	M
		E3	Floodplain	M
	Living with Water	F1	Waterfront Wandering	S
		F2	Waterfront Picnic	S
		F3	Meditative Space	S
		F4	Viewing Space	S

Identity of place	The protected area	G1	Old market town area	L
		G2	Traditional “Linpan”	L
	The Market	H1	Even Days Market On Unbuilt Space	M
		H2	The Farmers Market :	M
	The Riverbank	I1	Terraced riverbank	M
		I2	Natural riverbank	M
	Mobility	I3	Embankment	M
		J1	Bus stop	M
		J2	On street parking	M
		J3	Centralized parking	M
		J4	Flexible parking	M
	Tourist Attraction	K1	Heritage Site	M
		K2	Front shop back workshop	M
		K3	Tourist Center	M
	Productive Landscape	L1	Farm to table restaurant	M
		L2	Pick your own farm	M
	Community Hub	M1	Mahjong&Tea House	S
		M2	Suqare	S
	Interactive space	N1	Street Kitchen	S
		N2	Eating on Street	S
		N3	Shaded chating place	S
		N4	Parade watching space	S
	Infromal use of space	O1	Stepped Vendor Spaces	S
		O2	Wallside Vendor Spaces	S
		O3	Mobile Snack Carts	S
		O4	Even Days Market Stall	S

(1) Making a list and naming

To address the complexities of urban life, the research begins with selecting relevant themes and creating an initial list of patterns. These themes can arise from past experiences, prior research, field observations, literature review, or personal interests.

Effective pattern names are essential, as they encapsulate meaning and help communicate the pattern's intent to others (Fig 6.15). Thus, finding precise, concise terms that reflect the core of each pattern is crucial (Cai, 2018).

Festival	Festivel Space	P1	Main street	M
		P2	Secondary street	M
		P3	Lane	M
		P4	Large open space	M
	Temporary Connection	Q1	Temporary Wooden Bridge	M
		Q2	Temporary logistic	M
	Festival Events	R1	Parade	M
		R2	Sichuan Opera Show	M
		R3	Music event	M
	Festival Stalls	S1	Food Stalls	S
		S2	Grocery Stalls	S
		S3	Game Stalls	S
		S4	Truck Stalls	S
	Festival Facilities	T1	Large-Scale Facilities	S
		T2	Mid-Scale Facilities	S
		T3	Small-Scale Facilities	S

(2) In-depth research on each pattern

In this phase, each pattern undergoes comprehensive exploration to understand its cultural, social, and spatial relevance (Fig 6.16). Several complementary research methods are employed:

- Literature Review: Reading literature relevant to each pattern’s cultural and social context provides a foundational background for understanding its significance.
- Field Observations and Interviews: Conducting site visits, observing behaviors, and speaking with relevant individuals offers firsthand insights and personal experiences.
- Writing and Refinement: Writing detailed descriptions and reflecting on each pattern narrows down abundant information, enhancing clarity and focus.
- Sketching and Spatial Analysis: Sketches translate written concepts into spatial forms, grouping information into coherent scenes and considering aspects of scale.

These methods collectively deepen understanding and ensure a well-rounded approach (Cai, 2018).

Visual and diagrammatic representation

1. Selecting Representative Pictures: Pictures with a clear focus on each pattern are chosen as the first step in visualizing the connection between patterns and their spatial contexts.
2. Drawing Diagrams: Diagrams, including cross-scale illustrations and combinations of plans, sections, and maps, provide a clear explanation of each pattern’s function. These visuals can depict different scenarios, highlight social interactions, and illustrate how patterns shape urban space (Cai, 2018).

Statements (hypotheses)

A concise statement is formulated for each pattern, summarizing its purpose and significance in the urban context. These statements serve as hypotheses, explaining the pattern’s role in the city and its relationship to both physical spaces and social dynamics (Cai, 2018).

Practical implications

Each pattern is further explained in terms of its application in urban design, offering guidance on how it can inform real-world practices. This practical insight bridges theoretical concepts with tangible design strategies, emphasizing each pattern’s utility (Cai, 2018).

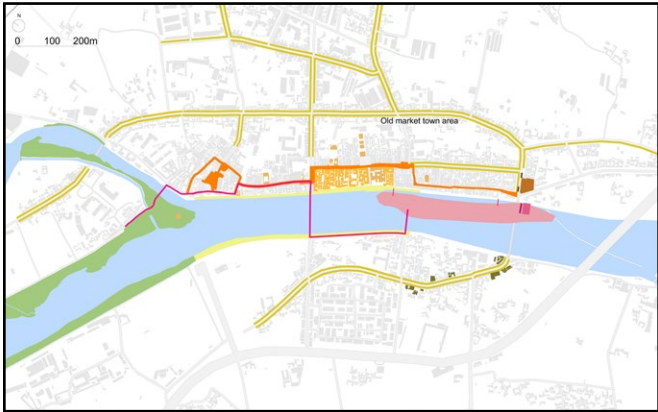


Fig 6.17: pattern projection process

	Identity of place	Climate adaption	Festival
Existing pattern			
Added pattern			

Fig 6.18: newly added pattern cards will be highlighted in a distinct color to differentiate them from existing patterns

E1 Seasonal rapeseed field	E3 Floodplain
----------------------------	---------------

Fig 6.19: Legend for existing patterns (left), Legend for newly added patterns (right).

(3) Pattern projection

Project the observation of patterns onto a map to visualize their spatial relationships and support the design generation process (Fig 6.17). During this workflow, newly added pattern cards will be highlighted in a distinct color to differentiate them from existing patterns (Fig 6.18;Fig 6.19).

Principle
(yellow-identity of place
green-climate adaption
red-festival)

Scale
(S-Facility scale
M-Market town scale
L-Regional scale)

Name Festival Streets

Type P2 Secondary street

Discription Lower pedestrian traffic, with wider spacing between stalls or activities, often branching from the main street.

Photo

Dimension
1:100

Capacity
(for small scale patterns)

Fig 6.16: In-depth research on each pattern

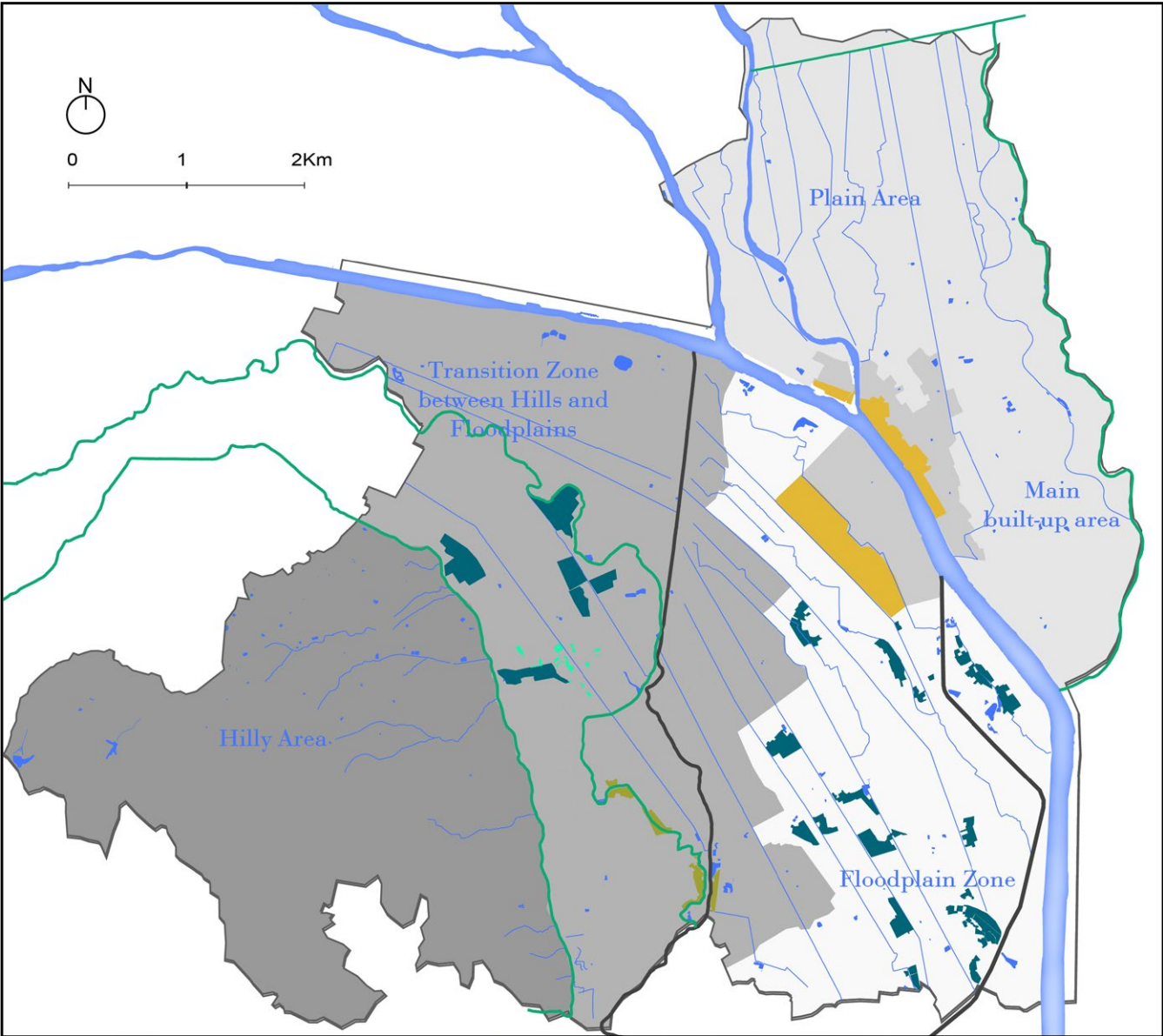
6.3.2 Observed patterns at the regional scale

6.3.2.1 Pattern list & projection

At this scale, the primary focus is on patterns related to the theme of 'climate adaptation'.

From Sections 6.2.1 and 6.2.2, we can conclude that at the regional scale, the site's water retention capacity is insufficient. To address this, the number of natural channels, hydraulic structures, and reservoirs should be increased to capture and store water during the rainy season, helping to mitigate spring droughts.

Therefore, when identifying patterns, special attention should be given to those related to the water system's overall water retention function (Fig 6.20).



- Ditch**
- A1 Concrete ditch
 - A2 Natural ditch
- Moisture Retention Planting**
- B1 Nursery
 - B2 Seasonal Rice Field
- Water Source**
- C1 Spring pit
 - C2 On-farm reservoir
- Resilient Vegetation**
- D1 Local flora buffer
- The protected area**
- G1 Old market town area
 - G2 Traditional “Linpan”

Fig 6.20: Observed Patterns at the Regional scale

Type:Ditch

Hypothesis:

Combining natural and artificial ditches can optimize water transportation efficiency while maintaining soil moisture under suitable conditions.

Practical implications:

For primary ditches, adopt natural forms. During drought, natural ditches may consume more water, so they can be combined with flora buffers and reservoirs. Flora buffers help maintain soil moisture, while reservoirs store excess water during floods. For secondary ditches, concrete ditches ensure efficient water distribution.

Type:Moisture Retention Planting

Hypothesis:

Planting methods that enhance water storage can mitigate drought effects and improve flood resilience.

Practical implications:

In flood-prone areas, planting enhances water retention. In low-lying areas with sufficient groundwater, wet crops strengthen soil moisture conservation.

Type:Water Source

Hypothesis:

Increasing surface water utilization helps mitigate drought and reduce reliance on groundwater.

Practical implications:

Plan small-scale regional water source projects to enhance water use efficiency and sustainability.

Type:Resilient Vegetation

Hypothesis:

Resilient vegetation can maintain soil moisture during drought and absorb excess water during floods, stabilizing ecosystems.

Practical implications:

Plant deep-rooted native vegetation and restore forests to enhance soil and ecological resilience.


Ditch

Ditch


A1 Concrete ditch

Concrete ditches enhance water transportation efficiency but are less effective at retaining soil moisture.

Photo:



Dimension: 1:1000




Ditch


A2 Natural ditch

Natural ditches allow soil to absorb moisture, making them suitable for ecological zones, though they may consume more water during droughts.

Photo:



Dimension: 1:1000




Moisture Retention Planting

Moisture Retention Planting


B1 Nursery

Nurseries increase biodiversity, aiding in water absorption and retention while stabilizing soil ecosystems.

Photo:



Dimension: 1:1000




Moisture Retention Planting

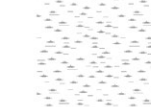
B2 Seasonal Rice Field

Seasonal rice fields store water in winter, often in low-lying areas that are difficult to drain. They improve soil fertility and drought resistance but have declining use due to low economic returns.

Photo:



Dimension: 1:1000




Water Source

Water source

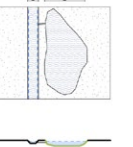
C1 Spring pit

Spring pits use groundwater for irrigation during droughts, serving as an emergency measure. However, they may strain long-term groundwater sustainability.

Photo:



Dimension: 1:4000




Water source


C2 On-farm reservoir

The ponds are dug by farmers during droughts and are connected to the main ditches. Excess water from rivers is directed into these ponds for storage. In the irrigation season, the stored water is utilized as a supplementary water source.

Photo:



Dimension: 1:4000



Resilient Vegetation

Resilient Vegetation

D1 Local flora buffer

Native deep-rooted vegetation stabilizes soil, reduces erosion, and maintains moisture, supporting the local ecosystem.

Photo:



Dimension: 1:1000



Type:The Protected Area

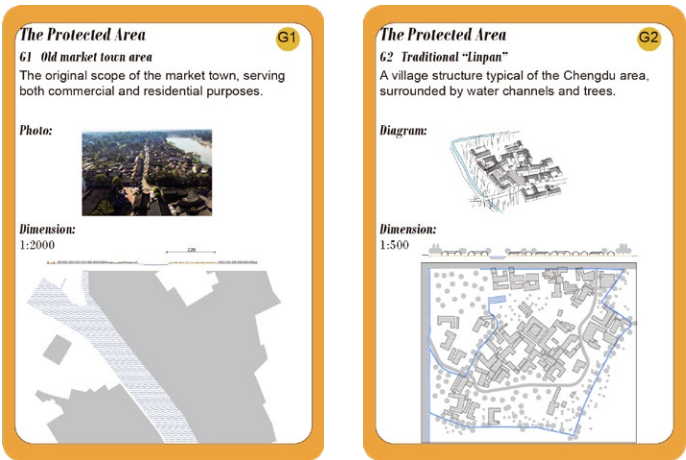
Hypothesis:

These patterns are a key characteristic of Yuantong town, enabling people to perceive cultural value and symbolism through spatial experiences.

Practical implications:

Utilize flood adaptation strategies to safeguard these areas from floods and establish a harmonious relationship with the environment.

The protected area



6.3.2.2 Pattern combination guidelines

The site can be understood as five zones: Hilly Area, Transition Zone Between Hills and Floodplains, Floodplain Zone, Main Built-Up Area, and Plain Area.

Hilly Area: This zone contains numerous water reservoirs that serve as the primary water source for agriculture and daily life.

Transition Zone Between Hills and Floodplains: This area features many spring pits. In the past, due to abundant groundwater, these spring pits were extensively excavated as a drought-resistant measure.

Floodplain Zone: The low-lying areas of this zone are home to many seasonal rice fields, a special type of farmland used for rice cultivation in summer and water storage in winter. However, the current area of such fields is only one-fifth of what it used to be.

Main Built-Up Area: This zone includes the primary urban area of Yuantong Town, along with the protected Old Market Town Area and traditional Linpan settlements.

Plain Area: This area features natural ditches that are integral to the site's hydrology (Fig 6.21).

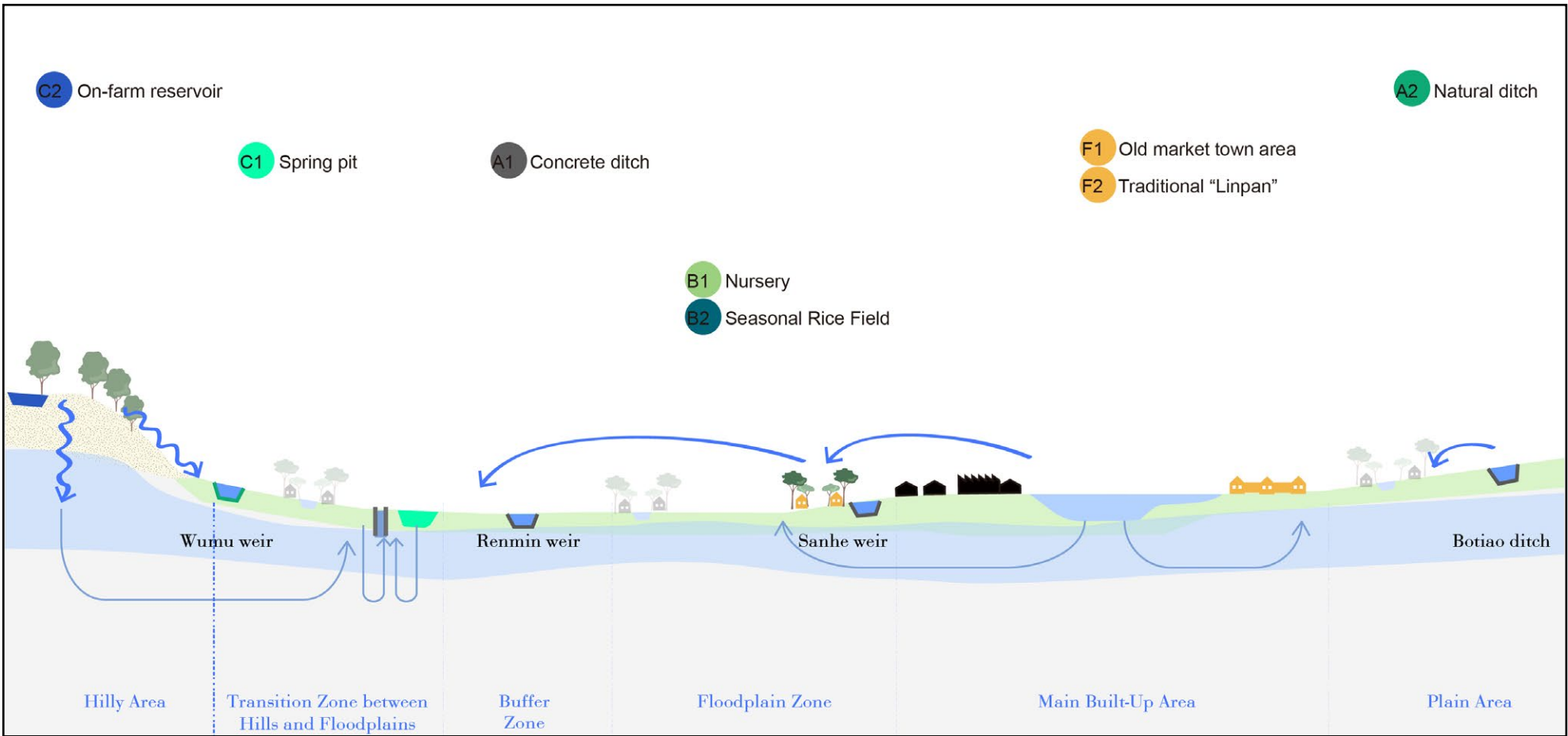


Fig6.21: Pattern interaction at the regional scale.

6.3.3 Observed patterns at the town scale

6.3.3.1 Pattern list & projection

At this scale, the primary focus is on patterns related to the themes of 'Identity' and 'Festival'. Valuable historic structures identified in the old market town (Section 6.1.3)—including the terraced riverbank, front shop-backyard buildings, even-days market, and gravel land festivals—are systematized into spatial patterns. This categorization aligns with the landscape biography framework of the Xi River developed in Section 6.1.2, enabling a structured mapping of cultural-ecological interactions. (Fig 6.22; Fig 6.23).

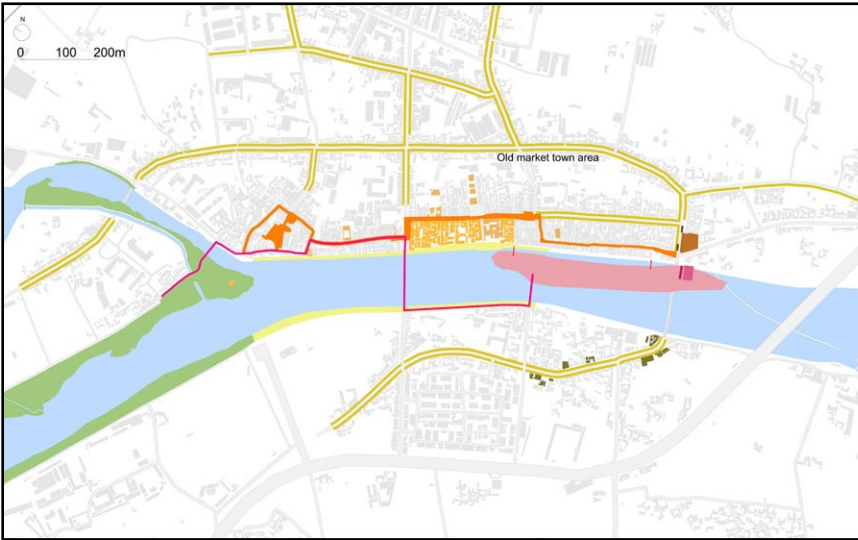


Fig 6.22: the Projection of the observed past patterns.

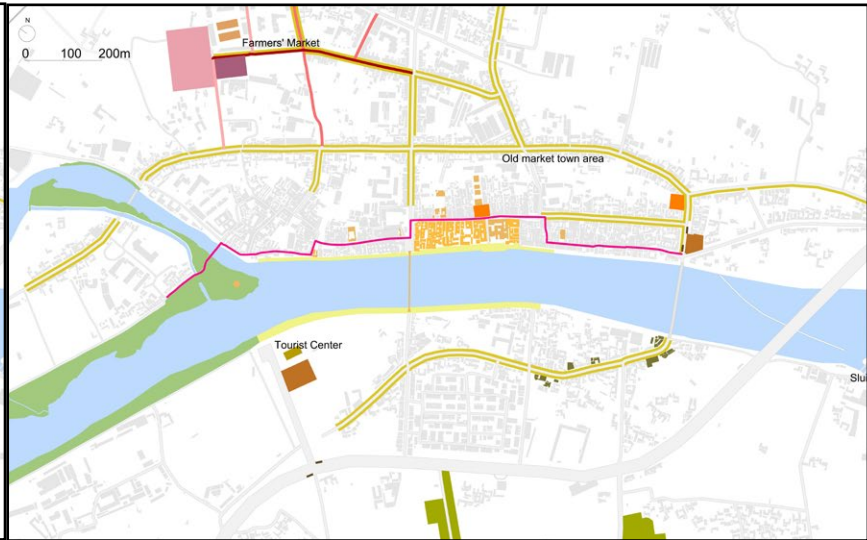


Fig 6.23: the Projection of the observed existing patterns.

Room for River

E1 Seasonal rapeseed field

The Market

H1 Even Days Market On Unbuilt Space

H2 The Farmers Market

Productive landscape

L1 Farm to Table Restaurant

L2 Pick Your Own Farm

The Riverbank

I1 Terraced Riverbank

I2 Natural Riverbank

Festival Space

P1 Main street

P2 Secondary street

P3 Lane

P4 Large Open Space

Mobility

J1 Bus Stop

J2 On street parking

K3 Centralized Parking

Temporary Connection

Q1 Temporary Wooden Bridge

Q2 Temporary Logistic

Tourist Attraction

K1 Heritage Site

K2 Front Shop Back Workshop Building

K3 Tourist Center

Festival Events

R1 Parade

R2 Sichuan Opera Show

R3 Music Event

Type:Room for River

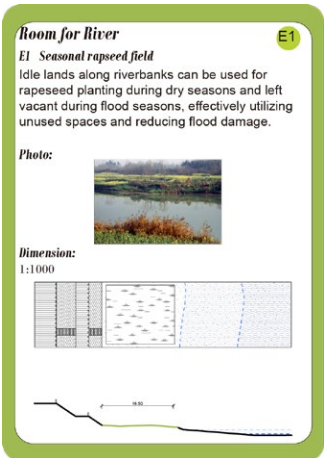
Hypothesis:

Allocate more space for rivers, reducing flood risks while enhancing land-use flexibility.

Practical implications:

Adjust land-use strategies to provide adaptive solutions for both flood and drought seasons.

Room for River



Type: The Market

Hypothesis:

Markets are a key characteristic of Yuantong town, enabling people to perceive cultural value and symbolism through spatial experiences.

Practical implications:

Plan spaces for different market forms and ensure their functionality in daily life.

Type: The Riverbank

Hypothesis:

The riverbank enhances the town’s locality and uniqueness, symbolizing its historical commercial significance and serving as crucial infrastructure under climate change.

Practical implications:

Preserve the riverbank's historical and ecological features while enhancing its functionality as a festival venue.

Type: Mobility

Hypothesis:

Rational mobility planning enhances the experience for both residents and tourists.

Practical implications:

Add parking duiring festival and ensure smooth flow of pedestrians, vehicles, and public transport

Type: Tourist Attraction

Hypothesis:

Enable tourists to perceive cultural connotations through symbolic spaces.

Practical implications:

Integrate with revitalized patterns like community hubs for synergy.

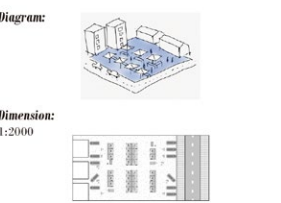
The Market

The Market

H1 Even Days Market On Unbuilt Space

A traditional market held in open spaces on even-numbered days, gathering vendors and fostering social interactions.

Diagram:



Dimension:
1:2000

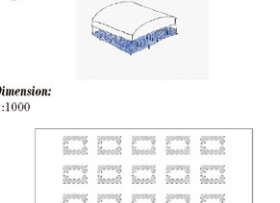
Icons: 350, 15, 30

The Market

H2 The Farmers Market

A government-built market with fixed stalls operating daily, ensuring the steady flow of goods and services.

Diagram:



Dimension:
1:1000

Icons: 250, 50

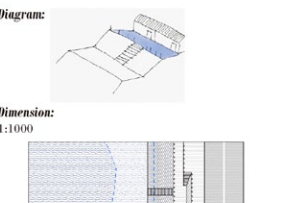
The Riverbank

The Riverbank

H1 Terraced riverbank

A two-layered structure of historical value. The lower layer was a dock, while the upper layer provided flood protection.

Diagram:



Dimension:
1:1000


Icons: 15/10m, 6/10m

The Riverbank

H2 Natural riverbank

Restores ecological features and reduces flood risks, showcasing the site’s natural uniqueness.

Photo:



Dimension:
1:1000

Icons: 15/10m, 6/10m


Mobility

Mobility

J1 Bus stop

Simple roadside stops for buses.

Photo:



Dimension:
1:1000


Icons: 6/15m

Mobility

J2 On street parking

Parking spaces distributed along streets, accommodating short-term stops.

Photo:



Dimension:
1:1000

Icons: 6/15m

Mobility

J3 Centralized parking

Larger, dedicated parking areas to accommodate higher traffic during festivals.

Photo:



Dimension:
1:2000

Icons: 100/1400m

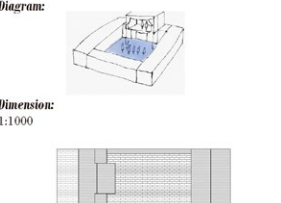
Tourist Attraction

Tourist Attraction

K1 Heritage Site

Includes traditional residences, guild halls, and other culturally significant structures.

Diagram:



Dimension:
1:1000

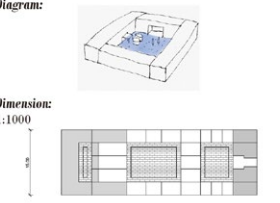
Icons: 20

Tourist Attraction

K2 Front shop back workshop

A building typology combining street-facing shops with courtyard-oriented living and workshop spaces, demonstrating the town’s heritage.

Diagram:



Dimension:
1:1000


Icons: 20

Tourist Attraction

K3 Tourist Center

A building typology combining street-facing shops with courtyard-oriented living and workshop spaces, demonstrating the town’s heritage.

Photo:



Type: Productive Landscape

Hypothesis:
Allow tourists to engage with local agriculture and ecology.

Practical implications:
Align with tourist routes to provide interactive and educational experiences.

Type: Festival Streets

Hypothesis:
Accommodate temporary street vendors during festivals and guide foot traffic to key destinations

Practical implications:
During festivals, careful consideration is needed to create a safe environment for pedestrians and manage waste.

Type: Temporary Connection

Hypothesis:
Provide temporary connections for festival access

Practical implications:
Temporary connections should be carefully planned, focusing on ease of access and safety during festivals.

Type: Festival Events

Hypothesis:
Enhance cultural expression and social engagement within public spaces

Practical implications:
As festivals evolve over time, it's necessary to preserve traditional events (like Sichuan opera and parades) while also creating space for new events (such as music festivals).

Productive landscape

Productive Landscape

L1 Farm-to-table restaurant

Restaurants serving home-cooked meals made with locally grown ingredients, offering an authentic culinary experience.

Diagram:

Dimension:
1:1000

50

Productive Landscape

L2 Pick your own farm

Farms where visitors can harvest crops themselves, often located near major transportation routes.

Diagram:

Dimension:
1:1000

20

Festival Space

Festival Streets

P1 Main Street

High pedestrian traffic with densely arranged stalls and activities, serving as the primary festival route and gathering place.

Photo:

Dimension:
1:1000

30/15m 2/15m 20/15m

Festival Streets

P2 Secondary street

Lower pedestrian traffic, with wider spacing between stalls or activities, often branching from the main street.

Photo:

Dimension:
1:100

30/15m 2/15m 15/15m

Festival Streets

P3 Lane

Narrow, compact layout with moderate to high pedestrian flow, creating intimate spaces for local vendors and smaller events.

Photo:

Dimension:
1:1000

30/15m 2/15m 10/15m

Festival Open Space

P4 Large open space

A large, unused plot of land that can host large-scale attractions such as amusement rides and festival events.

Photo:

Dimension:
1:1000

3000 50 150 15

Temporary Connection

Temporary Connections

Q1 Temporary Wooden Bridge

A wooden bridge constructed temporarily during the festival to provide access to the gravel land in the middle of the Xi River.

Diagram:

Dimension:
1:1000

30.0m

Temporary Connections

Q2 Temporary logistic

A dirt road built temporarily to facilitate logistics during the festival, ensuring smooth movement of goods and services.

Diagram:

Dimension:
1:1000

30.0m

Festival Events

Festival Events

R1 Parade

A celebratory procession through the streets, involving performances and vibrant public participation.

Photo:

Dimension:
1:1000

150

Festival Events

R2 Sichuan Opera Show

A traditional performance that showcases the local cultural heritage, requiring a suitable outdoor stage and audience seating area.

Photo:

Dimension:
1:1000

150

Festival Events

R3 Music event

A contemporary musical event, offering large-scale performances with space for standing, and audience interaction.

Photo:

Dimension:
1:1000

700 16

6.3.3.2 Pattern combination guidelines

In the past, people regularly held even days markets on the streets of the Old Market Town. Near the entrance of the Old Market Town, there was a bus stop. During festivals, a temporary connection would be established between the riverbank and the gravel land in the middle of the river. The streets were used as spaces for parades (Fig 6.24).

However, the connection between the festival and the river has now disappeared, and the Old Market Town area is also losing its identity. However, the landscape pattern is also changing. A new visitor center has been built on the west bank of the river, along with an additional bus stop. Tourists will primarily enter the site from the west bank, while local residents and residents of surrounding cities will mainly enter from the old bus stop (Fig 6.25).

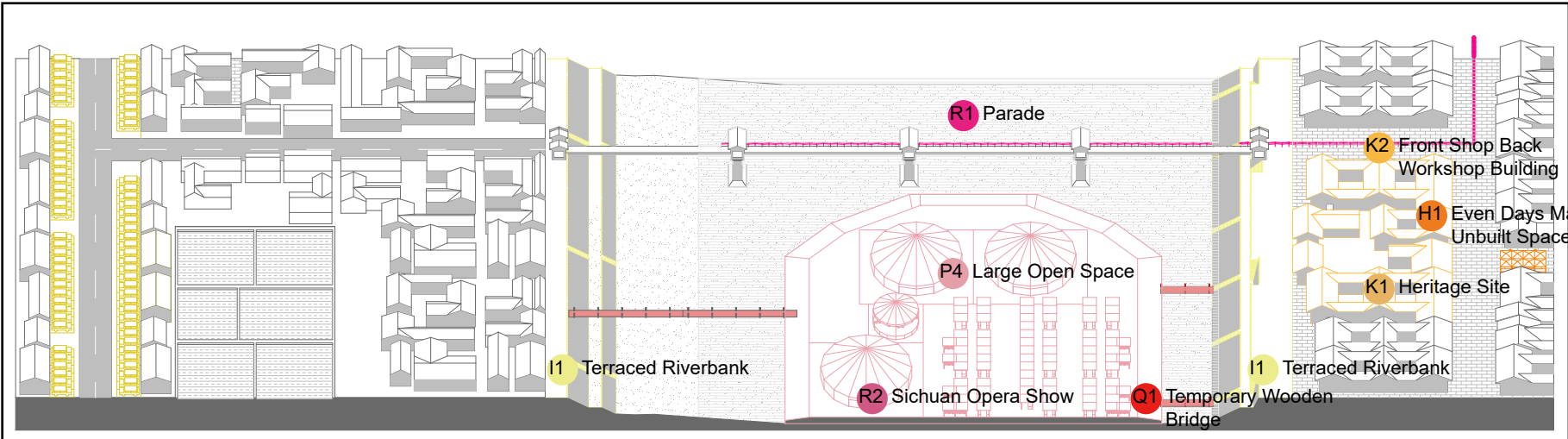
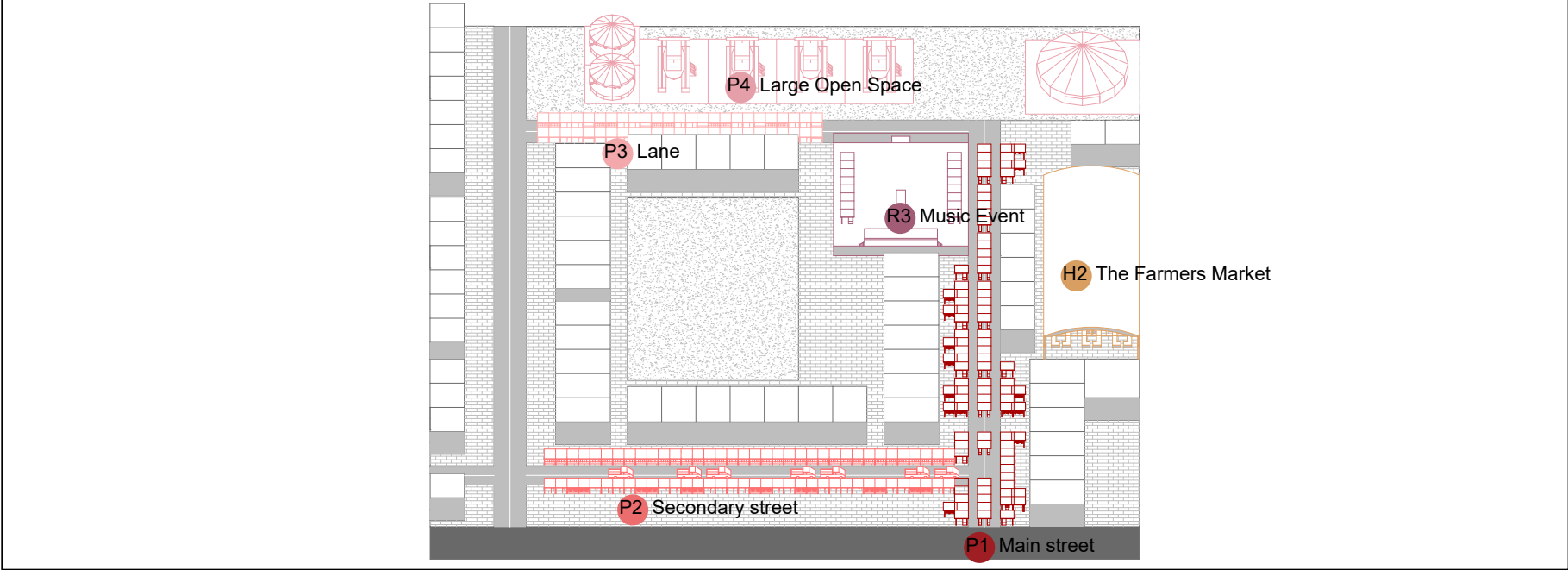


Fig 6.24: Past pattern interaction at the regional scale.



6.3.4 Observed patterns at the human scale

As described in Chapter 5.3, design is not a linear process. This chapter will outline the human-scale patterns observed on-site. These patterns will be reinforced in the top-down design approach.

Type: Community Hub

Hypothesis:
EMeet local residents’ needs while respecting cultural and daily habits.

Practical implications:
Provide spaces fostering community activities such as festival squares, market streets, or parks.

Type: Interactive Space

Hypothesis:
These interactive space acts as living theaters and showcase the identity of the place while supporting the residents' and tourists' social needs.

Practical implications:
Design spaces for urban life that promote interaction and provide opportunities for seeing and being seen.

Type: Informal Use of Streets

Hypothesis:
activate public spaces, foster a sense of community

Practical implications:
This form of space allows itinerant vendors to set up their temporary in places where foot traffic is low due to the absence of stores while taking up very little space. Designers should take use of this space to create a vital public space.

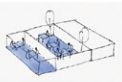
Community Hub

Community Hub


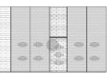
M1 Mahjong&tea House

Indoor social spaces for playing mahjong and drinking tea.Usually have outdoor seating areas extending into the street, allowing interaction between patrons and passersby.

Diagram:



Dimension:
1:1000




Community Hub


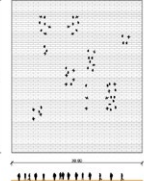
M2 Square

Open spaces where locals gather for dancing, chatting, and socializing daily.

Photo:



Dimension:
1:1000




Interactive space

Interactive Space



N1 Street Kitchen

The owner of the snack shop often sits at the entrance, preparing food, allowing passing tourists to see the entire process.

Diagram:



Dimension:
1:500




Interactive Space


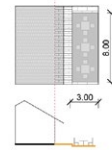
N2 Eating on street

Tourists prefer to eat on the street.

Photo:



Dimension:
1:500




Interactive Space


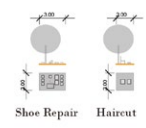
N3 Shaded chatting place

Shaded spaces providing rest areas for residents, tourists, and vendors

Diagram:



Dimension:
1:500




Interactive Space


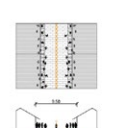
N4 Parade watching space

Residents place chairs outside their homes to socialize with passersby.

Photo:



Dimension:
1:500



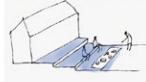
Infromal use of space

Infromal Use of Space



01 Stepped Vendor Spaces

Vendors sell handmade goods or food by sitting on stairs, creating flexible and dynamic interactions.

Diagram:



Dimension:
1:1000




Infromal Use of Space



02 Walside Vendor Spaces

Vendors display goods on spare walls in alleys, utilizing minimal space.

Diagram:



Dimension:
1:1000



Infromal Use of Space

03 Mobile Snack Carts

Vendors can sell their homemade food.

Photo:



Dimension:
1:1000



Infromal Use of Space

04 Even Days Market Stall

Vendors display goods on spare walls in alleys, utilizing minimal space.

Photo:



Dimension:
1:1000



Type: Festival Stalls

Hypothesis:
Enhance both the cultural identity and economic vitality of a location

Practical implications:
Designers need to provide adequate spaces for various types of stalls to ensure smooth operation and engagement with the public.

Type: Festival Facilities

Hypothesis:
The destination for most visitors

Practical implications:
Designers need to allocate enough space to accommodate a variety of amusement facilities to ensure a satisfying visitor experience.


Festival Stalls

Festival Stalls

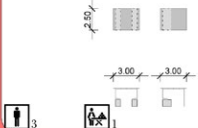
S1 Food Stalls

Stalls selling food, typically arranged with a canopy. Vendors pay a fee to the government for the space during festivals.

Photo:



Dimension:
1:500




Festival Stalls

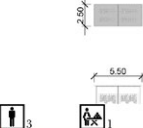
S2 Grocery Stalls

Stalls selling groceries, requiring more space than food stalls. These are often larger and also require vendors to pay fees to the government.

Photo:



Dimension:
1:500




Festival Stalls

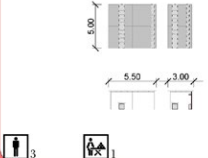
S3 Game Stalls

Stalls offering games or interactive activities, requiring more space than food and grocery stalls. Vendors pay a fee to the government.

Photo:



Dimension:
1:500




Festival Stalls

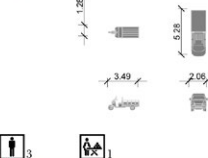
S4 Truck Stalls

Vendors selling larger goods (such as tools and seedlings) set up on the festival's periphery. Trucks are used for transporting goods, and fees are paid to the government.

Photo:



Dimension:
1:50




Festival Facilities

Festival Facilities

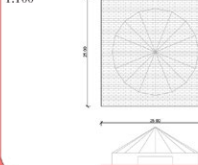
T1 Large-Scale Facilities

Includes large attractions like circuses, requiring ample space. Vendors pay a fee to the government and set up only during festivals.

Photo:



Dimension:
1:100




Festival Facilities

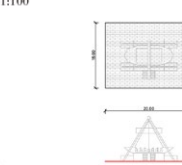
T2 Mid-Scale Facilities

Includes attractions such as pirate ships, requiring moderate space. Vendors operating these facilities also pay fees to the government and set up during festivals.

Photo:



Dimension:
1:100




Festival Facilities

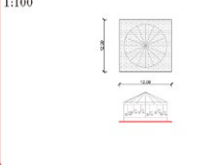
T3 Small-Scale Facilities

Includes smaller attractions like carousels. These facilities are temporary and operate only during festivals, with vendors also paying fees to the government.

Photo:



Dimension:
1:100



6.3.5 Conclusion

The development of a pattern language for Yuantong Town’s social-spatial landscape reveals a multi-layered, context-sensitive approach to understanding and addressing urban complexities. By integrating Cai Jiaxiu’s three-step methodology—listing and naming patterns, conducting in-depth research, and projecting patterns—this study bridges theoretical exploration with practical application, emphasizing the interplay between cultural identity, climate adaptation, and communal rituals across scales.

At the regional scale, patterns related to climate adaptation, such as natural water channels, reservoirs, and seasonal rice fields, highlight the critical need to restore hydrological systems to mitigate droughts and floods. The division of the site into five distinct zones (hilly, transitional, floodplain, built-up, and plain areas) underscores the interdependence of ecological and infrastructural elements, emphasizing the importance of localized water retention strategies.

At the town scale, patterns tied to identity and festivals—such as the terraced riverbank, front shop-backyard buildings, and the historic even-days market—reveal how spatial structures historically supported social cohesion and economic vitality. However, the erosion of these patterns, particularly the disconnection of festivals from the river and the fragmentation of the Old Market Town’s identity, calls for interventions that revive cultural narratives while adapting to contemporary needs. The evolving landscape, including new tourist infrastructure on the river’s west bank, presents opportunities to rebalance local and visitor flows while preserving heritage.

At the human scale, observed patterns—such as temporary festival connections, parade routes, and daily interactions in public spaces—demonstrate the role of adaptable, fine-grained design in fostering social engagement. Reinforcing these patterns in a top-down design framework ensures that human-centered experiences remain integral to broader planning goals.

By employing cross-disciplinary methods—literature reviews, field observations, sketches, and collaborative projections—this research not only maps existing and historical patterns but also tests their clarity and interrelationships. Future work should focus on translating these patterns into actionable design principles, testing their adaptability in evolving urban contexts, and exploring how their interactions might address emerging challenges in Yuantong Town and similar settings.

07

Integration

This chapter combines a top-down morphological approach and a bottom-up pattern language approach to complete the design at three different scales.

7.1 Planning at the town scale

7.1.1 Added patterns

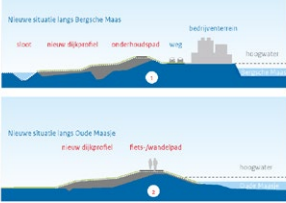
Room for river

Room for River

E2 Resettlement

Relocate housing from flood-prone areas to reduce risks to property and human life during floods.

Photo:



Source: <https://www.ruimtevoordervier.nl/> (Dijkverbetering Amer/Dongse)

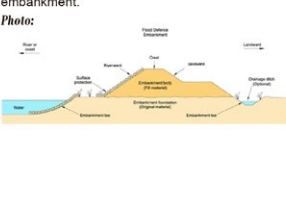
The Riverbank

The Riverbank

I3 Embankment

Water flow guidance: Control the direction of the river and optimize drainage pathways. Land use optimization: Ensure the floodplain can be safely used for agriculture. Transportation function: Roads can be built on the embankment.

Photo:




Source: Cross section of an earthen embankment showing the relevant showing typical arrangement of elements (after Morris et al., 2009)

Room for River

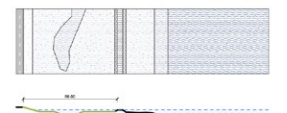
E3 Floodplain

Planned floodplains provide more space for rivers during flood seasons, mitigating flood impacts while offering opportunities for ecological restoration.

Photo:



Dimension: 1:1000




Mobility

Mobility

J4 Flexible parking

It serves multiple functions. During festivals, it provides temporary parking space. On regular days, it transforms into a recreational space.

Photo:



Dimension: 1:1000



16-24/20m

Under the 'Room for River' type, the patterns 'Floodplain' and 'Resettlement' have been added. Under the 'Mobility' type, the pattern 'Flexible Parking' has been added.

During the recombination of patterns, both the lost historical patterns and the existing ones are preserved. By integrating newly added patterns, a more dynamic and multi-use waterfront space is created, accommodating various functions (Fig 7.1; Fig 7.2).

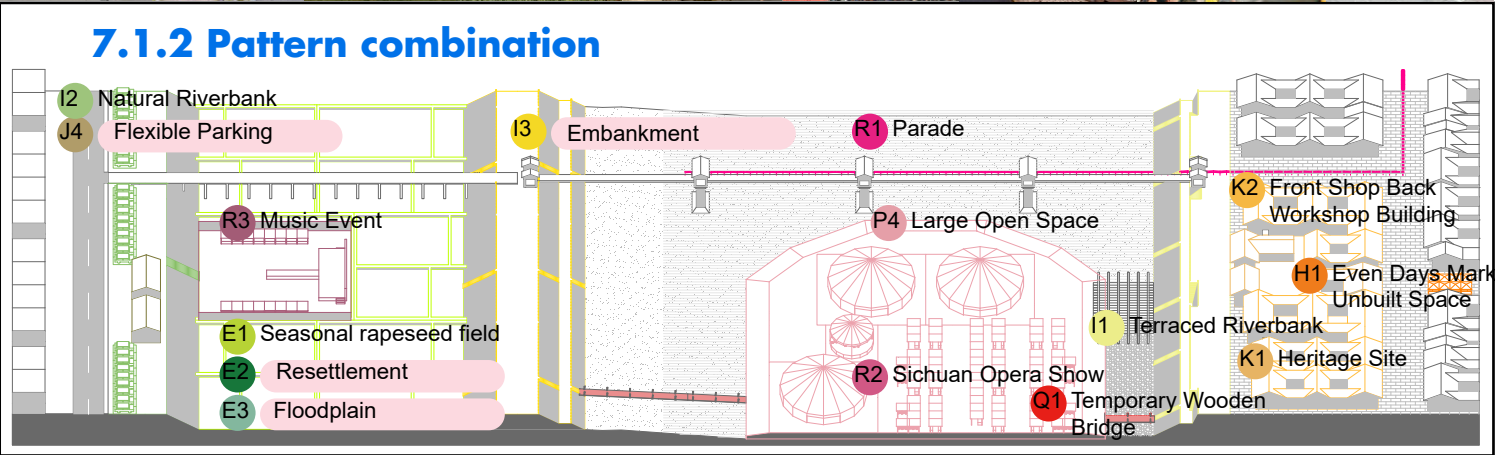


Fig 7.1: Pattern recombination

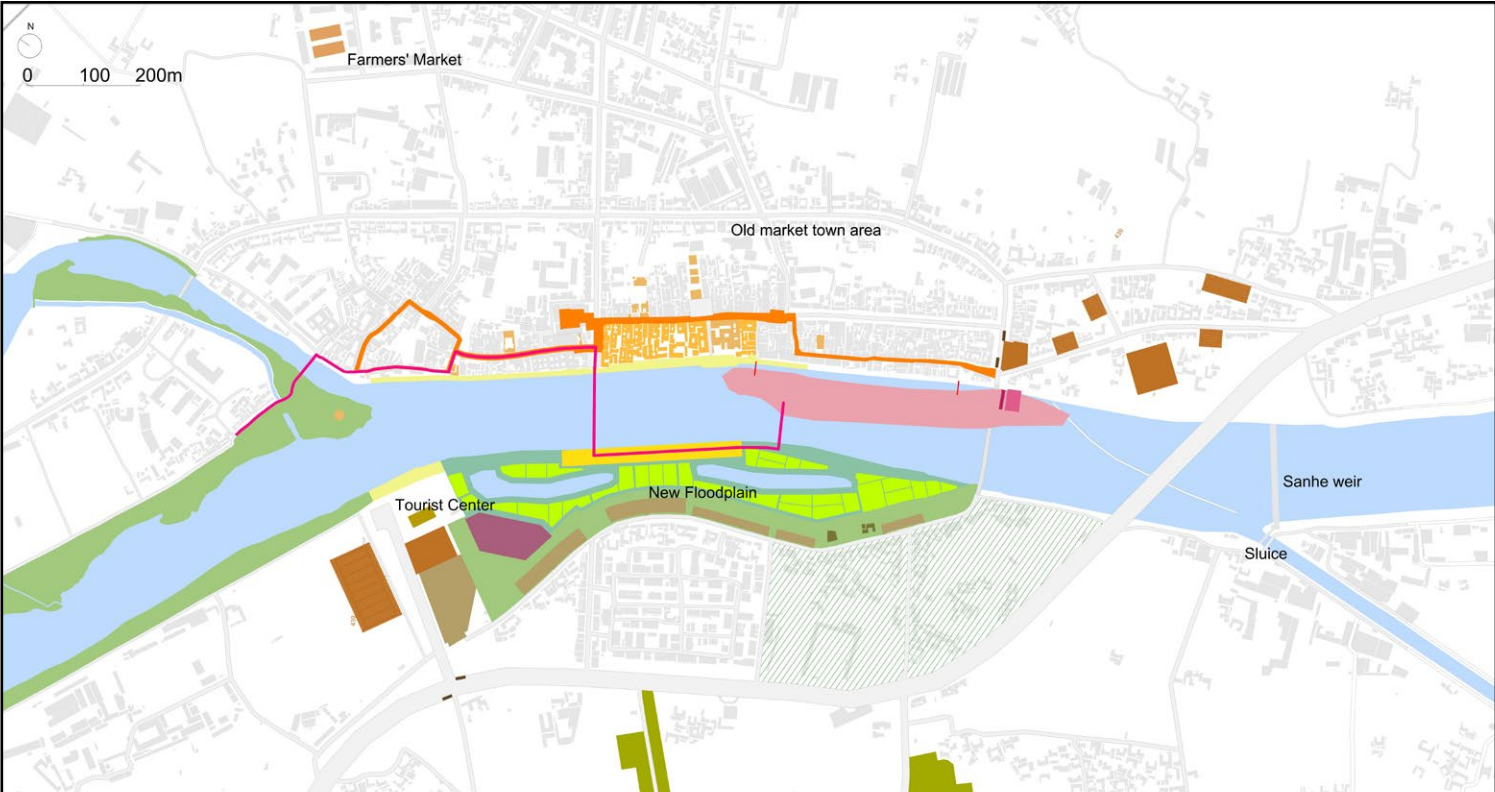


Fig 7.2: Pattern recombination

Room for River

- E1 Seasonal rapeseed field
- E2 Resettlement
- E3 Floodplain

The Market

- H1 Even Days Market On Unbuilt Space
- H2 The Farmers Market

The Riverbank

- I1 Terraced Riverbank

I2 Natural Riverbank

- I3 Embankment

Mobility

- J1 Bus Stop
- J3 Centralized Parking

J4 Flexible Parking

- K1 Heritage Site

Tourist Attraction

- K2 Front Shop Back Workshop Building
- K3 Tourist Center

Productive landscape

- L1 Farm to Table Restaurant
- L2 Pick Your Own Farm

Festival Space

- P4 Large Open Space

Temporary Connection

- Q1 Temporary Wooden Bridge
- Q2 Temporary Logistic

Festival Events

- R1 Parade
- R2 Sichuan Opera Show
- R3 Music Event

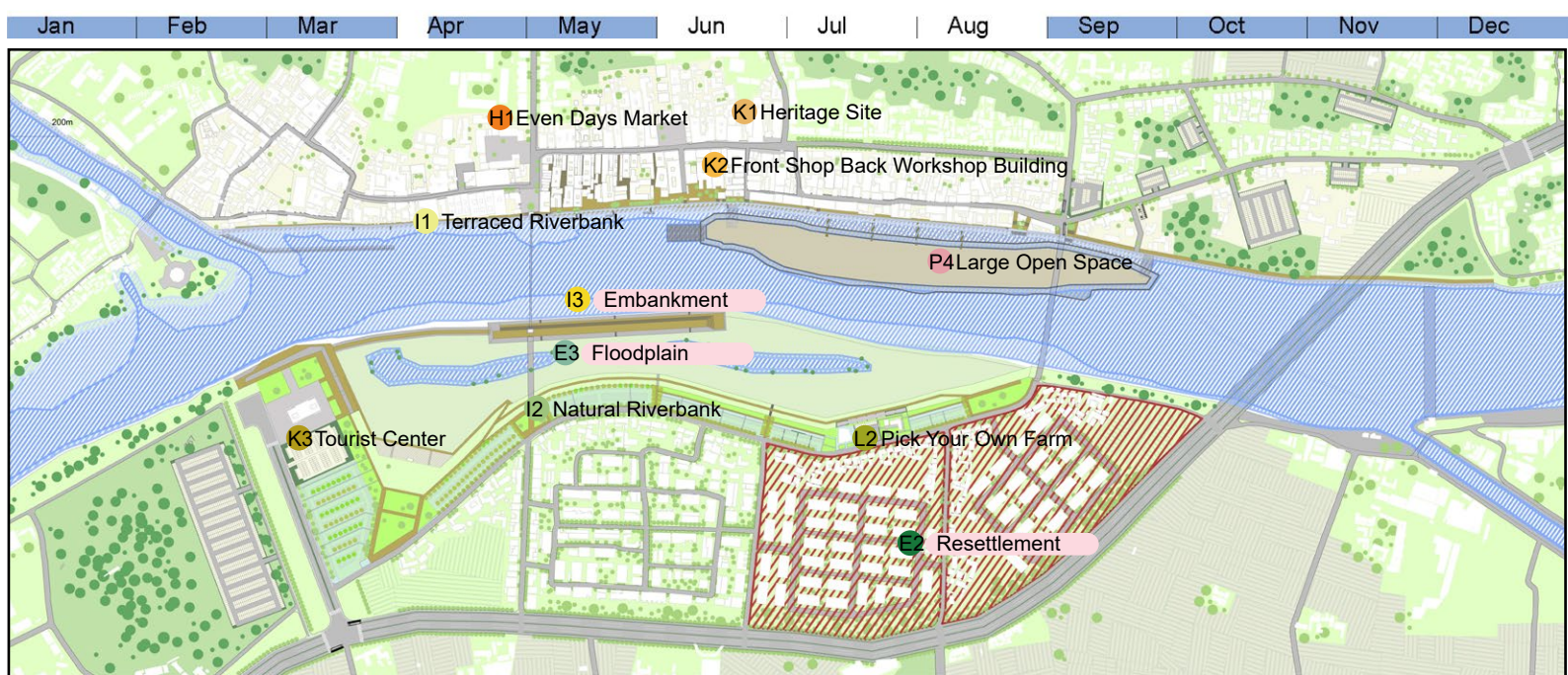


Fig 7.3: Masterplan during the normal period

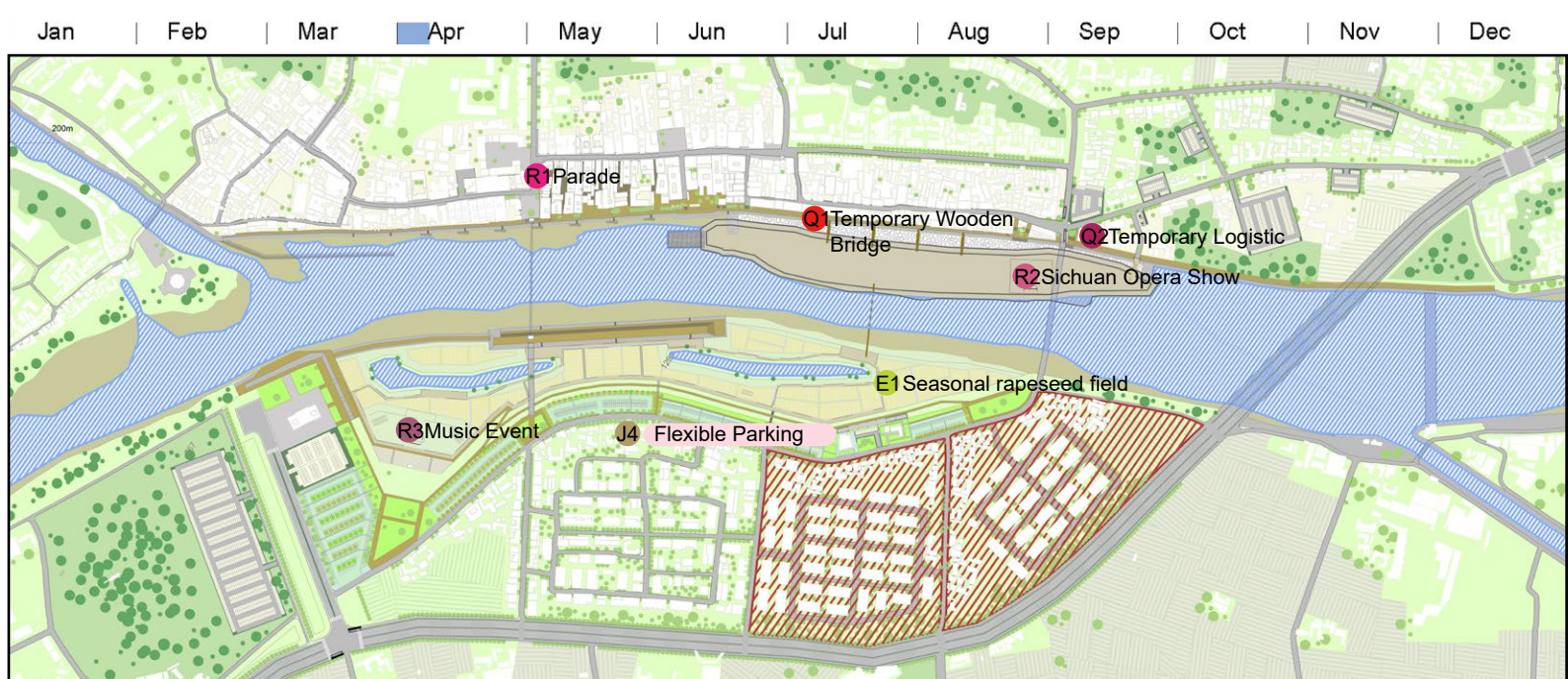


Fig 7.4: Masterplan during the festival period

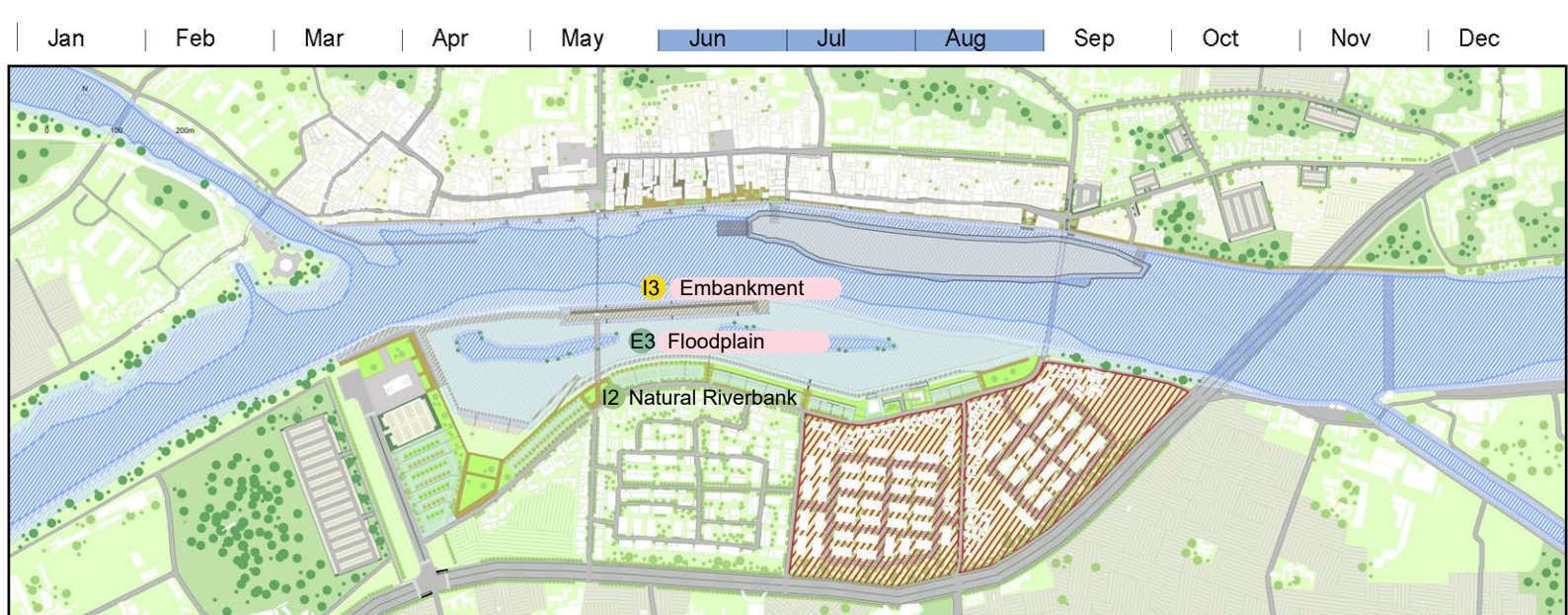


Fig 7.5: Masterplan during the flooding period

7.1.3 The result

The Old Market Town's historic market typologies have been restored, accompanied by the rehabilitation of the central gravel land within the river through a top-down design approach. A multifunctional floodplain has been implemented on the west bank adjacent to the visitor center, serving dual purposes of hydrological expansion and recreational enhancement while elevating the western riverfront's landscape value.

Traditional water management systems—including bamboo cage embankments, revetments, and a fish-shaped hub structure—have been deployed to safeguard the Old Market Town and stabilize the gravel land. A bamboo cage weir regulates water levels dynamically, ensuring adaptive hydrological control.

Strategic parking reconfiguration has introduced centralized facilities near riverside bus stops, eliminating on-street parking. The floodplain accommodates temporary festival parking, while the restored gravel land hosts cultural programming—traditional Sichuan opera performances on the gravel terrain contrast with contemporary music events within the floodplain.

The site operates through three seasonal modalities:

Festival Period: A temporary pontoon bridge connects riverbanks to the gravel land. The floodplain transforms into a rapeseed field, its bloom coinciding with festivals to reinforce place identity. Integrated field paths enable nature immersion, while the floodplain's edge functions as auxiliary parking.

Normal Period: Gravel land access persists via seasonal bridges, with activity zones restricted to permit ecological succession. The floodplain reverts to passive recreation.

Flood Period: Submersion of floodplain and gravel land triggers bridge removal to optimize hydraulic efficiency.

7.2 Zoom in design on human scale

7.2.1 Added patterns

Living with Water

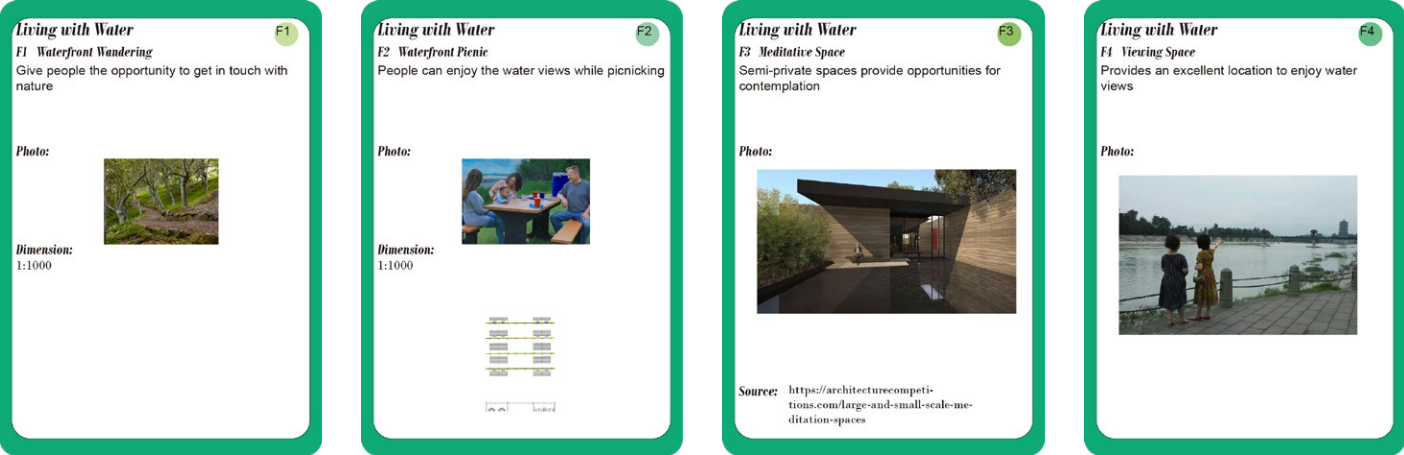
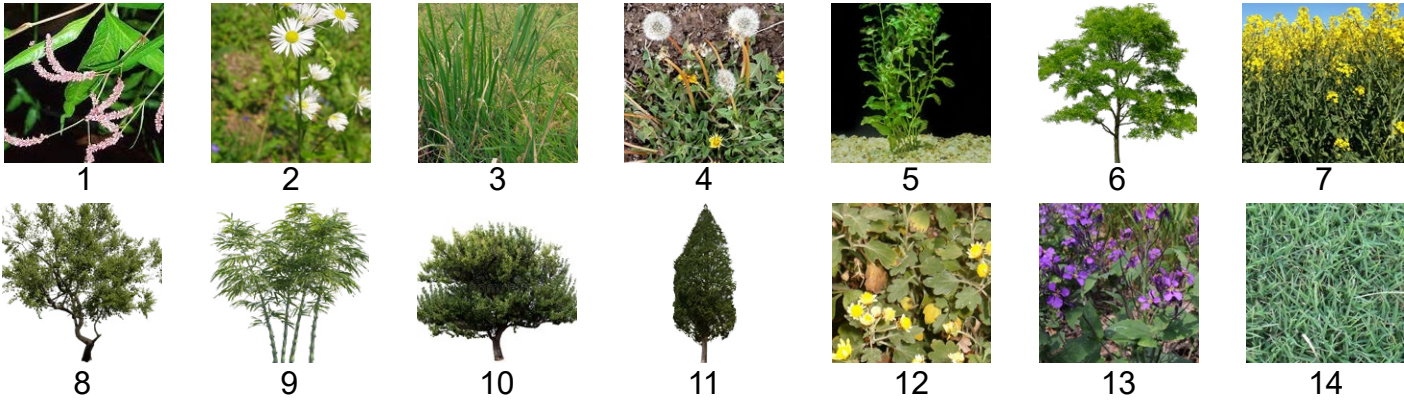


Fig 7.6: Zoom-in design sites

Under the "Human Scale" category, the pattern type "Living with Water" has been added, which includes "Waterfront Wandering", "Waterfront Picnic", "Meditative Space", and "Viewing Space". Five representative areas have been selected as sites for zoom-in design (Fig 7.6).

7.2.2 Species choice



1. Willowweed
2. Eastern daisy fleabane
3. Wild rice stem
4. Chinese dandelion
5. Curly pondweed
6. Chinese Gleditsia
7. Rapeseed
8. Chinese tallow tree
9. Bamboo
10. Camphor tree
11. Dawn redwood
12. Wild chrysanthemum
13. Chinese violet cress
14. Bermudagrass

Indigenous vegetation

Native plant communities are reintroduced to stabilize slopes, improve water retention, and rebuild habitat networks.

Adaptive vegetation in floodplains

Floodplain vegetation is selected to thrive in both submerged and dry conditions, ensuring ecological functionality across seasonal extremes.

Root system

Deep-rooted species are elected for soil stabilization and water retention in erosion-prone areas. Shallow-rooted species are used in water-saturated zones to prevent surface soil erosion while allowing rapid vegetative coverage.

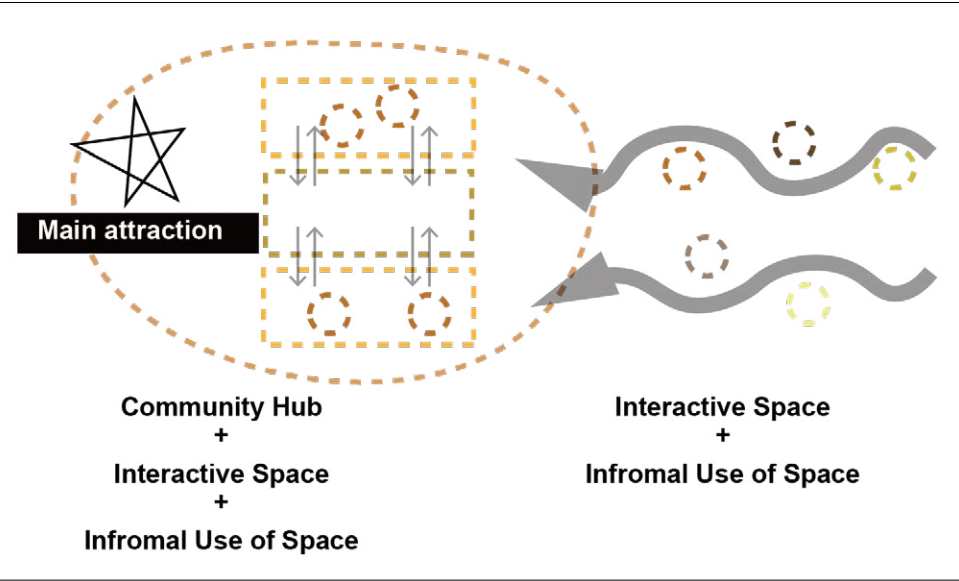
Spatial partitioning

Open sightlines are maintained in recreational and cultural hubs to foster social interaction and scenic engagement with the river. Targeted screening is employed to soften built structures, reduce visual clutter, and create semi-private enclaves.

7.2.3 The result

7.2.3.1 The old market town

Pattern combination rules



Interactive Space + Informal Use:

Streets contain multiple pattern types of interactive spaces. Combining these with informal use patterns can make the space more vibrant.

Community Hub + Informal Use

The square, functioning as a community hub—a gathering-oriented space—can integrate informal use patterns like the "even day market" as its main attraction. Shaded chat places (an interactive space pattern) are incorporated to foster social interaction.

(Fig 7.7; 7.8 ; 7.9; 7.10).



Fig 7.7: Scenario-the old market town-normal period



Fig 7.8: Patterns at human scale-



Fig 7.9: Scenario-the old market town



Fig 7.10: Patterns at human scale-

Community Hub

M2 Square

Festival Stall

S1 Food Stalls

Interactive Space

N1 Street Kitchen

N2 Eating Outside

N3 Shaded Chating Place

N4 Parade Watching Space

Infromal Use of Space

O1 Stepped Vendor Spaces

O2 Wallside Vendor Spaces

O3 Mobile Snack Carts

O4 Even Days Market Stall

Detailed design

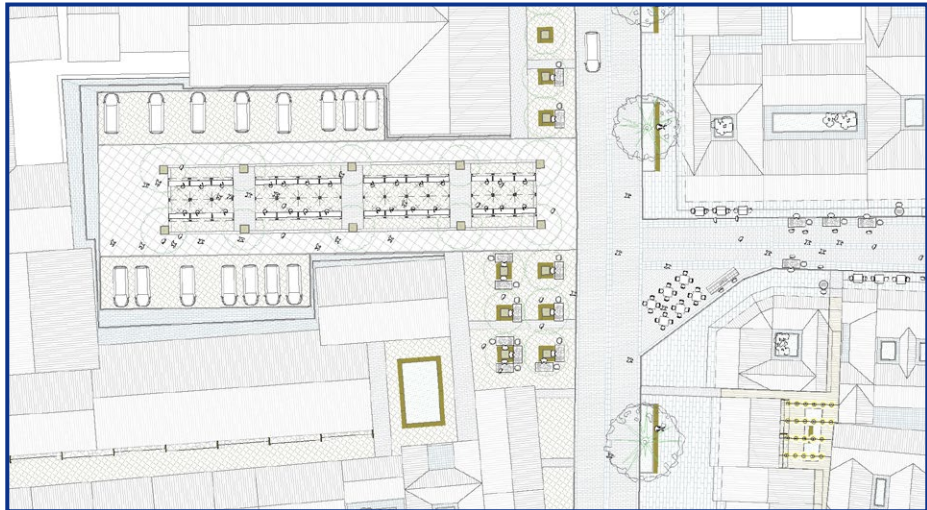


Fig 7.11: Detailed design-the old market town-normal period

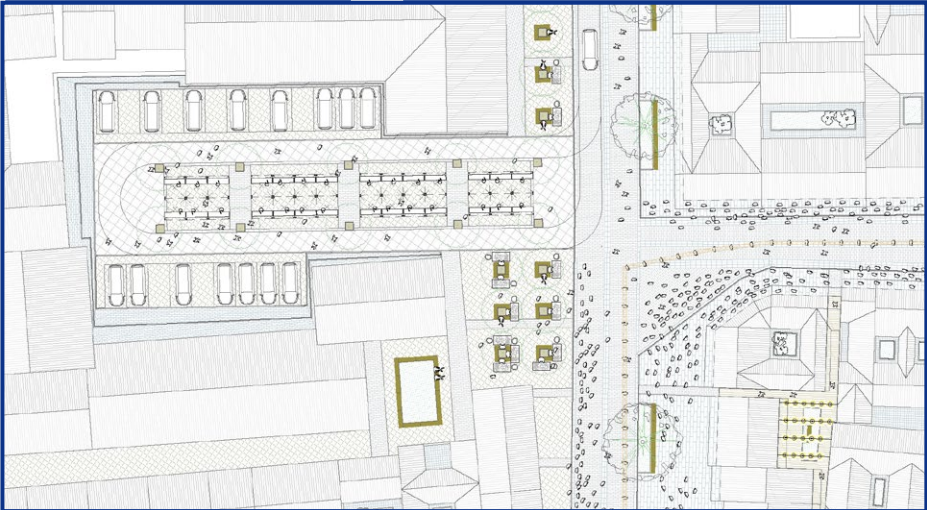
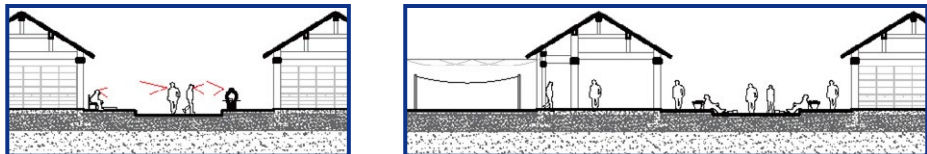
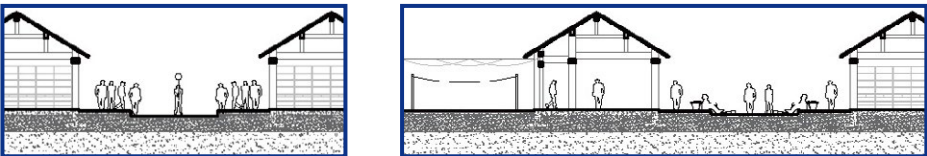


Fig 7.12: Detaied design-the old market town-festival period



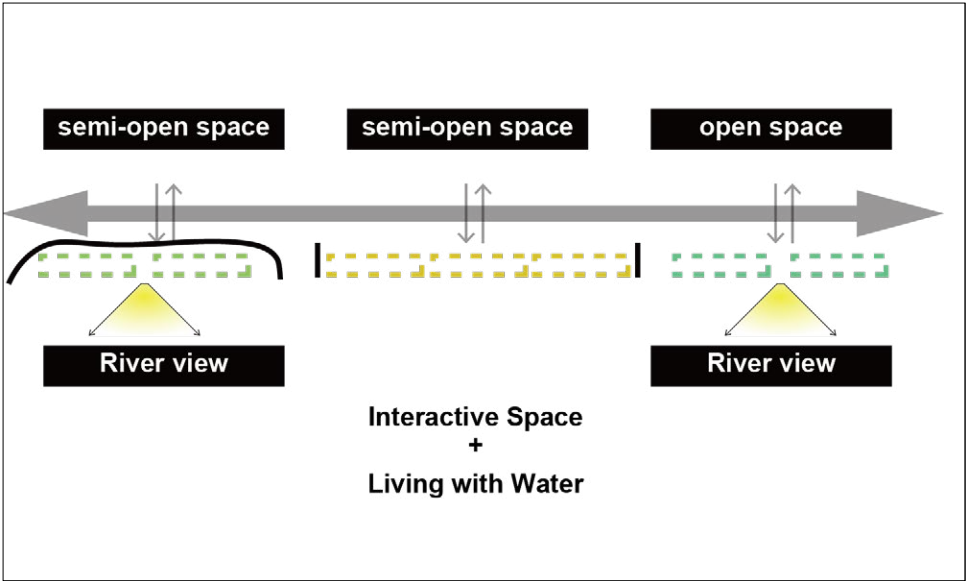
In the square area, spatial division is implemented through differentiated material treatments. Market stalls are designed with flexible layouts, incorporating demountable stall units and temporary logistical pathways. Shaded chat spaces are strategically positioned beneath tree canopies on both sides of the market, maintaining visual continuity with the commercial area.

The stepped spaces along the streets are expanded to facilitate multiple activities. Vendors may establish informal stalls on the steps; visitors can enjoy street-side dining; merchants may demonstrate culinary preparation processes at their storefronts. During festival periods, parade processions traverse these streets while spectators observe performances from the stepped viewing areas.

(Fig 7.11; 7.12).

7.2.3.2 The waterfront of the old market town

Pattern combination rules



Interactive Space + Living with Water
The "Interactive Space" pattern (e.g., Eating Outside) is deployed along social nodes of the waterfront, requiring vibrant spatial qualities. Concurrently, visual connectivity with the river must be preserved. The "Living with Water" pattern (e.g., Viewing Space + Meditative Space) is interwoven, demanding tranquil spatial conditions. This necessitates careful consideration of spatial partitioning and circulation routing in the design.

(Fig 7.13; 7.14 ; 7.15; 7.16).



Fig 7.13: Scenario-the waterfront of the old market town-normal period

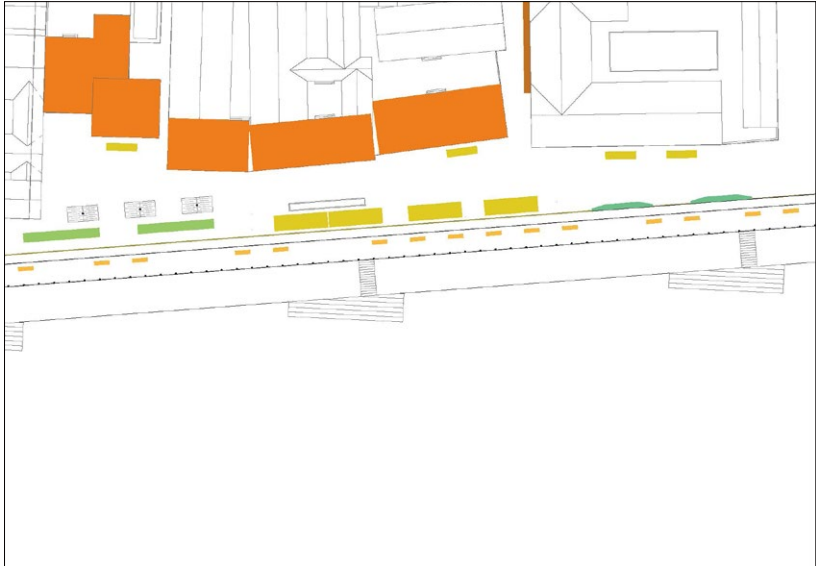


Fig 7.14: Patterns at human scale-the waterfront of the old market town-normal period



Fig 7.15: Scenario-the waterfront of the old market townn-festival period



Fig 7.16: Patterns at human scale-the waterfront of the old market townn-festival period

Community Hub
M1 Mahjong&Tea House

Interactive Space
N2 Eating Outside
N3 Shaded Chating Place

Infromal Use of Space
O1 Stepped Vendor Spaces
O2 Wallside Vendor Spaces

Living with Water
F3 Meditative Space
F4 Viewing Space

Festival Stall
S1 Food Stalls

Detailed design

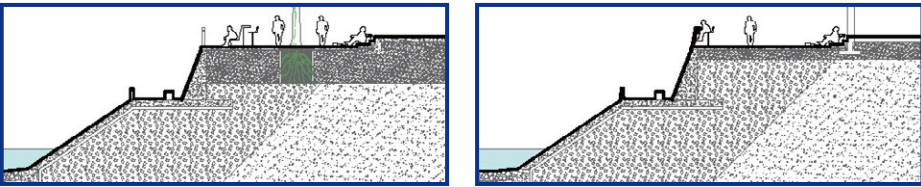


Fig 7.17: Detailed design-the waterfront of the old market town-normal period

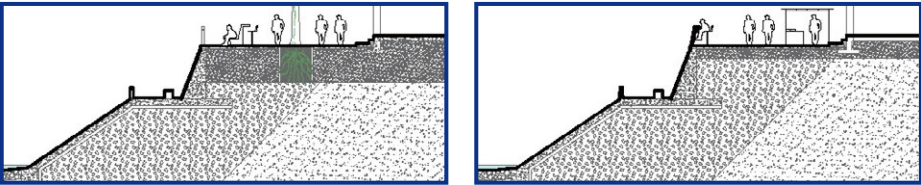
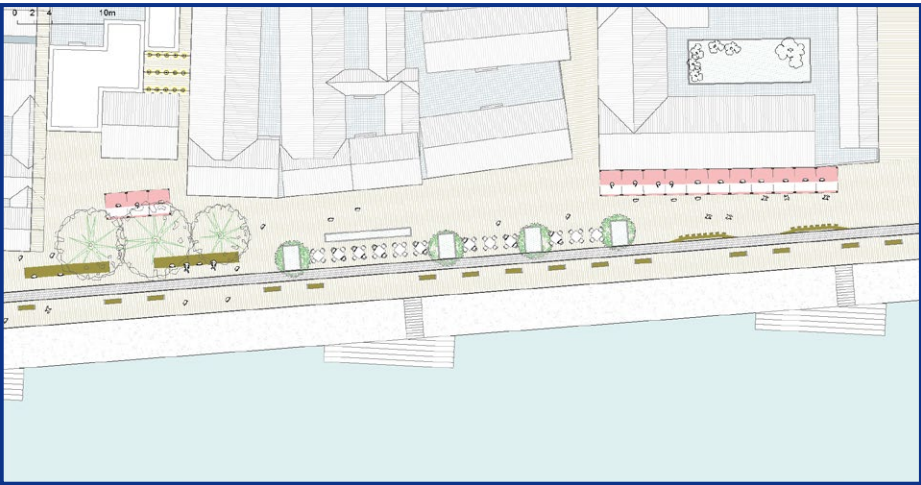


Fig 7.18: Detailed design-the waterfront of the old market town-festival period

Spatial division is implemented through vegetation while maintaining visual linkages.

A hybrid "Viewing Space + Eating Outside" composite pattern is developed. Seating and dining tables are integrated with railings, oriented toward the waterbody, enabling simultaneous dining and scenic engagement.

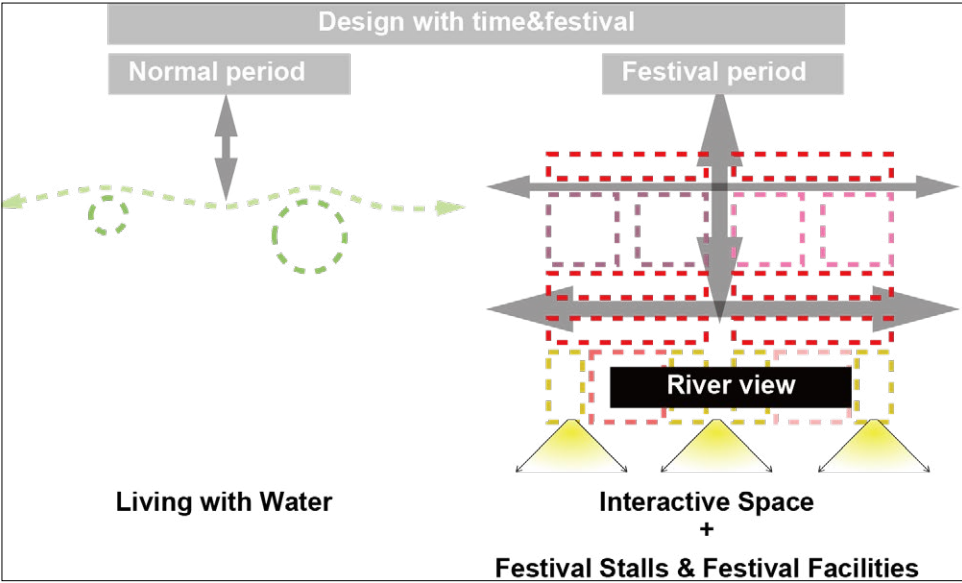
In meditative space design, semi-private enclosures are formed using 90 cm-high chairbacks.

During festival periods, temporary festival stalls can be installed within the waterfront zone.

(Fig 7.17; 7.18).

7.2.3.3 The gravel land in the middle of the river

Pattern combination rules



Design with time & festival:

Temporal dimensions must be considered when applying patterns. During the normal period, the site functions as a natural landscape, utilized for Waterfront Wandering and Meditative Space.

During festivals, the Gravel Land manifests cultural attributes, with festival-related patterns such as Festival Stalls and Festival Facilities systematically arranged

(Fig 7.19; 7.20 ; 7.21; 7.22).



Fig 7.19: Scenario-the gravel Land in the middle of the river-normal period

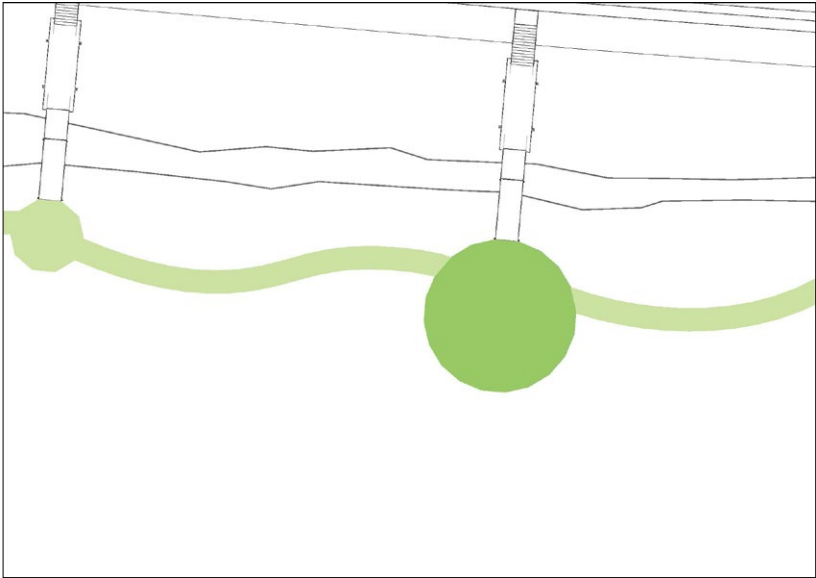


Fig 7.20: Patterns at human scale-the gravel Land in the middle of the river-normal period



Fig 7.21: Scenario-the gravel Land in the middle of the river-festival period



Fig 7.22: Patterns at human scale-the gravel Land in the middle of the river-festival period

Interactive Space

N2 Eating Outside

Living with Water

F1 Waterfront Wandering

F3 Meditative Space

Festival Stall

S1 Food Stalls

S2 Grocery Stalls

S3 Game Stalls

Festival Facility

T1 Large-Scale Facilities

T2 Mid-Scale Facilities

T3 Small-Scale Facilities

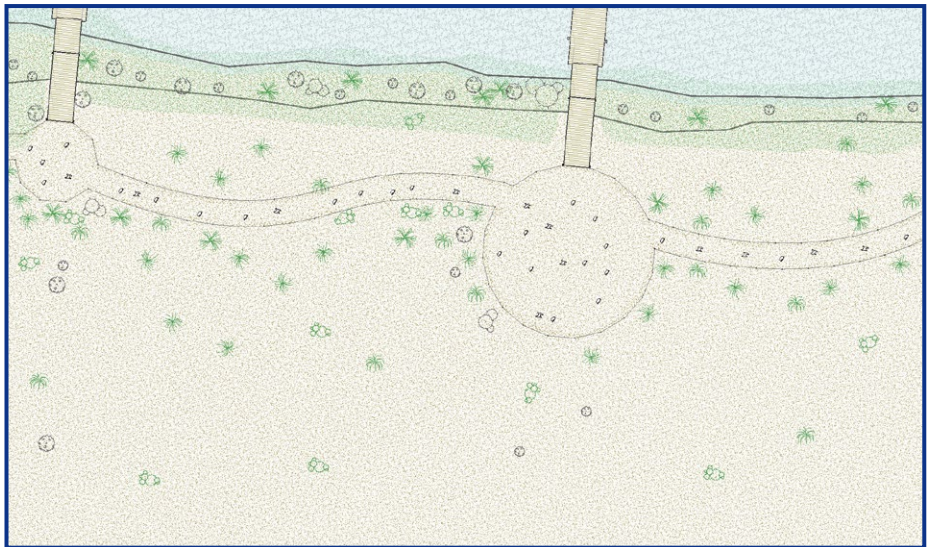


Fig 7.23: Detialed design-the gravel Land in the middle of the river-normal period

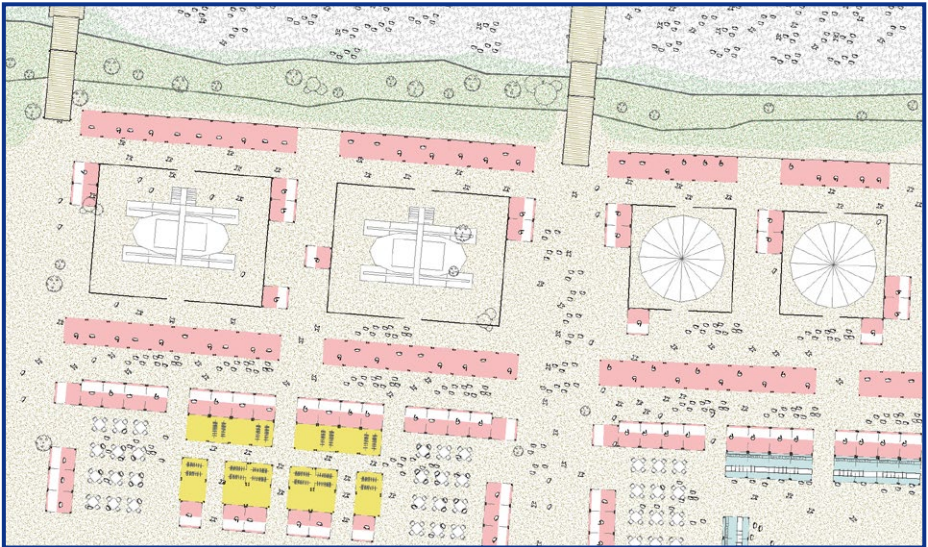
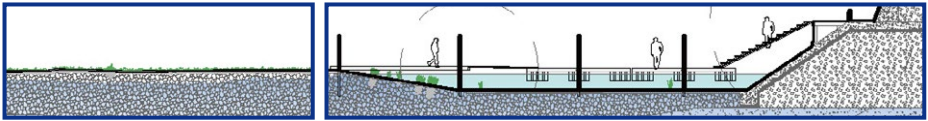
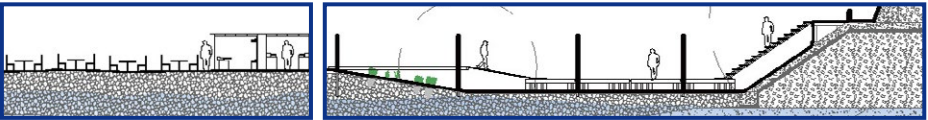


Fig 7.24: Detialed design-the gravel Land in the middle of the river-festival period

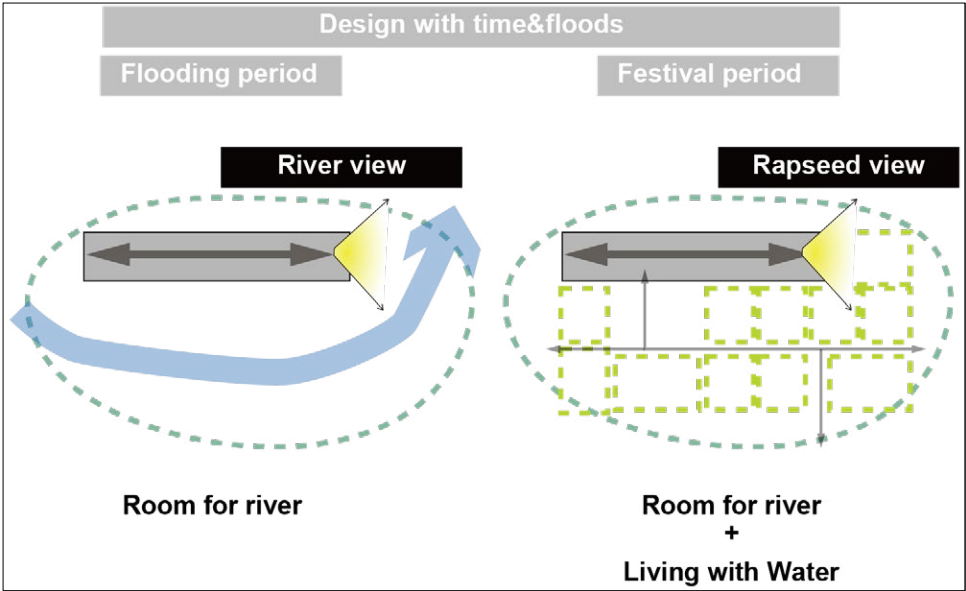


During the Normal Period, a wooden fence is installed to regulate access to restricted land areas. Unrestricted zones of the Gravel Land undergo natural ecological succession. The pontoon bridge floats synchronously with water-level fluctuations, anchored by metal poles. A rail system integrated into the bridge enables adjustable stair and ramp angles in response to hydrological changes. Annual herbaceous plants regenerate on the Gravel Land, moderately enhancing ecological quality.

During Festivals, The Gravel Land is reconfigured for cultural programming, temporarily suspending herbaceous vegetation growth. Festival facilities are clustered adjacent to the Market Town for logistical integration. Food stalls, grocery stalls, game booths, and dining zones are strategically positioned along the riverfront to capitalize on scenic vistas. Site access is facilitated via the pontoon bridge system. (Fig 7.23; 7.24).

7.2.3.4 The embankment

Pattern combination rules



Design with time & floods:
During the normal period, the floodplain is utilized as a seasonal rapeseed field, while accommodating waterfront wandering and viewing spaces. Rapeseed blooms across the floodplain during festivals, reinforcing the site's identity.

During floods, the floodplain primarily serves flood discharge functions.

(Fig 7.25; 7.26 ; 7.27; 7.28).



Fig 7.25: Scenario-the embankment-normal period

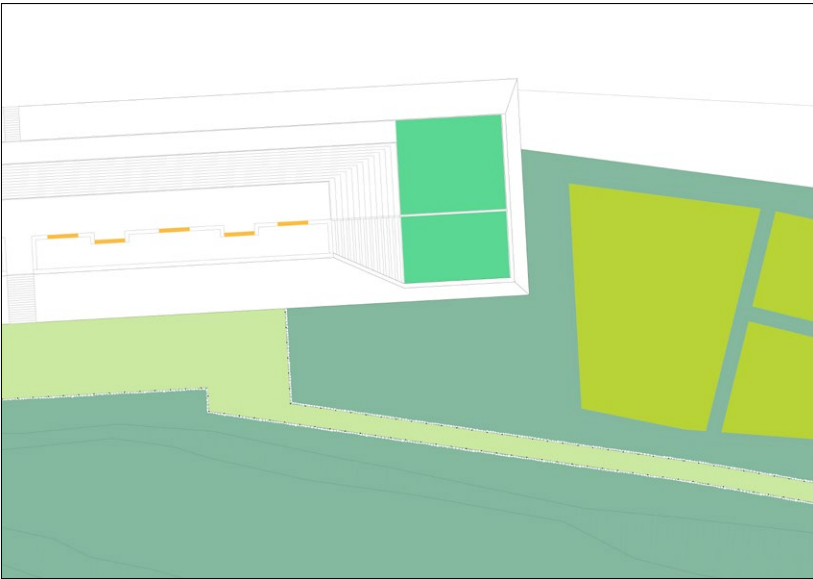


Fig 7.26: Patterns at human scale-the embankment-normal period



Fig 7.27: Scenario-the embankment-festival period

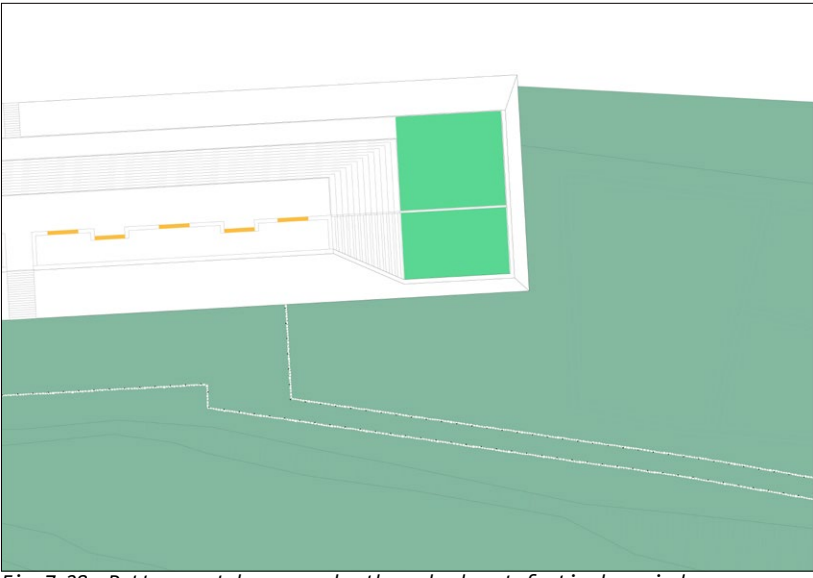


Fig 7.28: Patterns at human scale-the embankment-festival period

- Room for River**
 - E1 Seasonal rapeseed field
 - E3 Floodplain
- Interactive Space**
 - N3 Shaded Chating Place
- Living with Water**
 - F1 Waterfront Wandering
 - F4 Viewing Space

Detailed design

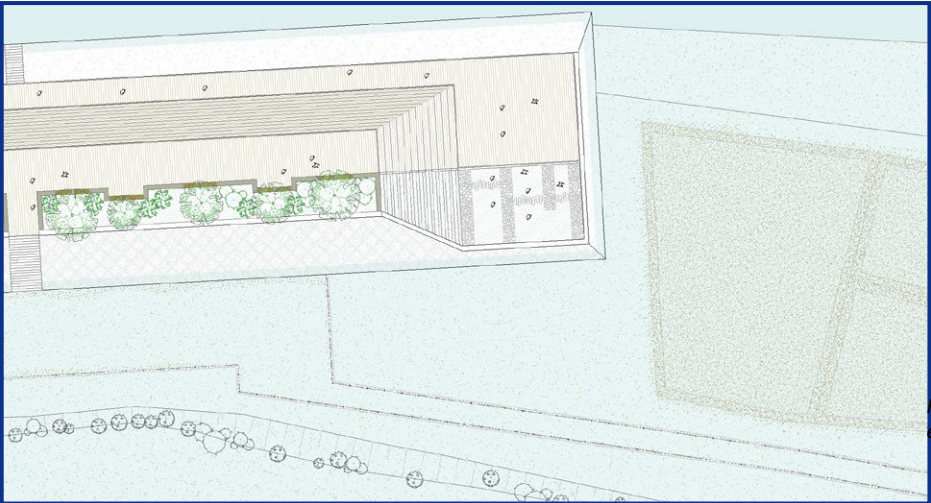


Fig 7.29: Detailed design-the embankment-normal period

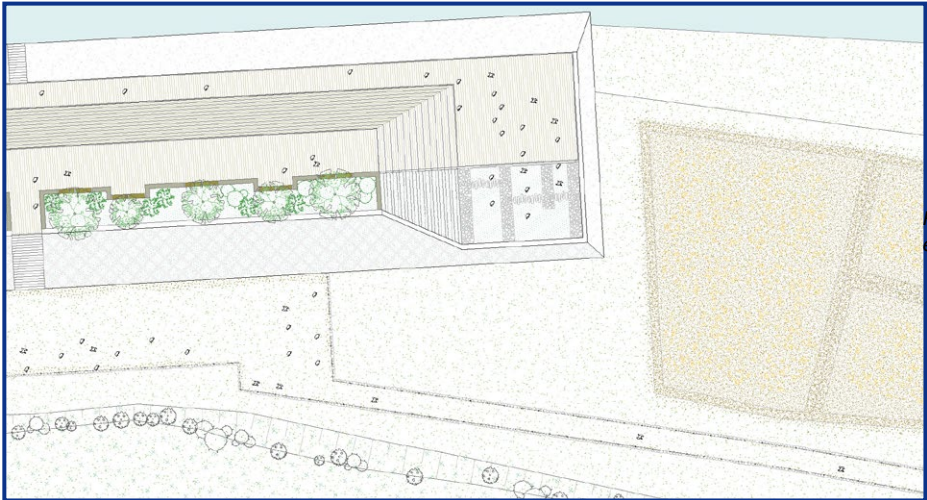
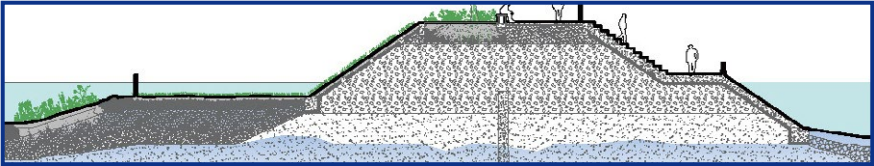
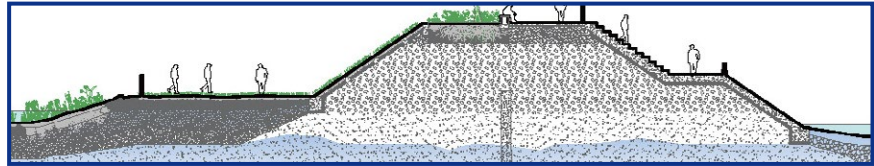


Fig 7.30: Detailed design-the embankment-festival period



Climate-adaptive floodplain management techniques are employed to regulate flooding and spatial patterns. During floods, the floodplain is inundated, with excess water stored, rendering the waterfront wandering pattern temporarily unavailable. The stored water is gradually released during dry periods.

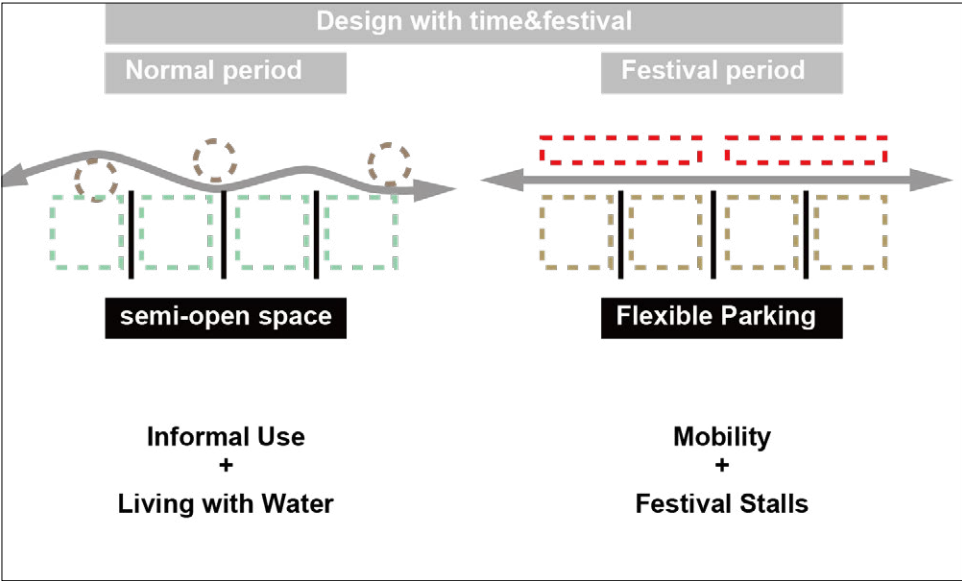
The river's western bank is reconstructed as an embankment. The new waterfront configuration enhances floodwater management. Shallow-rooted tree species are selected to prevent structural damage. Considering Heritage Palimpsest, contrasting paving and landscaping treatments distinguish between historic and new embankment structures.

To resolve functional conflicts between flood and non-flood periods, wooden stakes demarcate wandering routes. These stakes remain visible when submerged during floods, serving as water-level indicators.

(Fig 7.29; 7.30).

7.2.3.5 The waterfront of the floodplain

Pattern combination rules



Design with time & festival:

During the normal period, the site functions as a picnic area. Some imformal stalls can also be set up here.

During the festival period, the area will function as a flexible parking lot. This pattern is employed to resolve conflicts between festival parking needs and daily landscape functions. Some festival stalls can also be set up here.

(Fig 7.31; 7.32 ; 7.33; 7.34).



Fig 7.31: Scenario-the waterfront of the floodplain-normal period



Fig 7.32: Patterns at human scale-the waterfront of the floodplain-normal period



Fig 7.33: Scenario-the waterfront of the floodplain-festival period



Fig 7.34: Patterns at human scale-the waterfront of the floodplain-festival period

- Mobility**
 - J4 Flexible Parking
- Infromal Use of Space**
 - O3 Mobile Snack Carts
- Living with Water**
 - F1 Waterfront Wandering
 - F2 Waterfront Picnic
- Festival Stall**
 - S1 Food Stalls



Fig 7.35: Detialed design-the waterfront of the floodplain-normal period

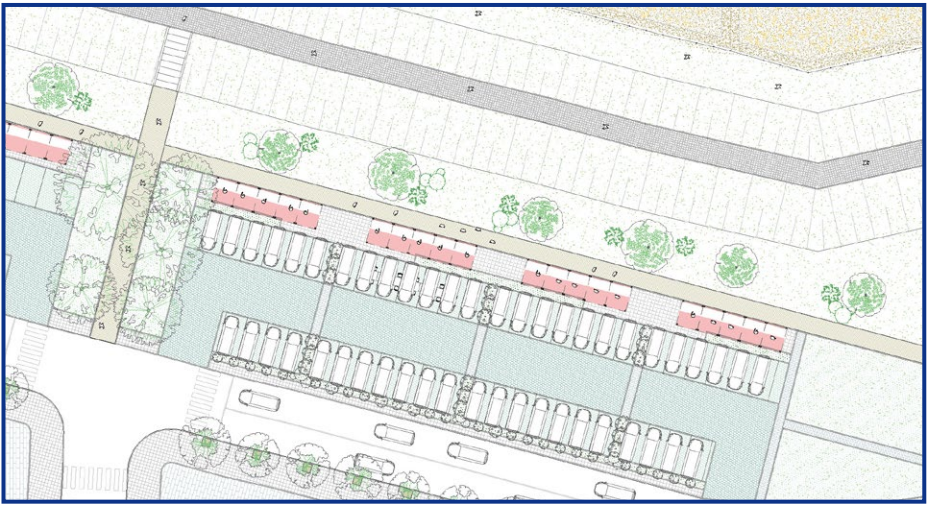
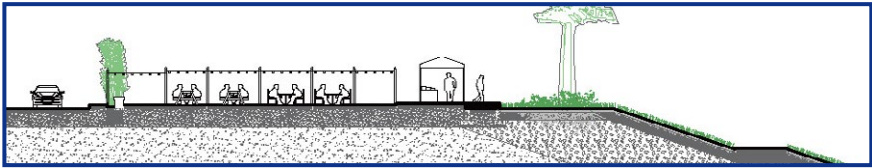
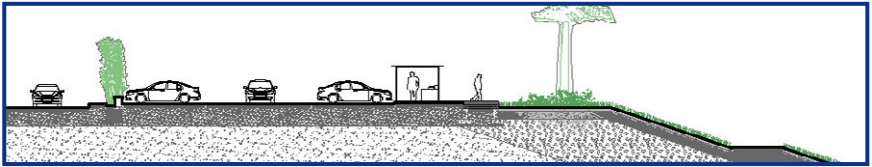


Fig 7.36: Detialed design-the waterfront of the floodplain-festival period



Permeable materials, natural wooden planks, and reclaimed stones are utilized to construct the flexible parking lot, minimizing environmental impact. Deep-rooted tree species are selected to reinforce the waterfront soil.

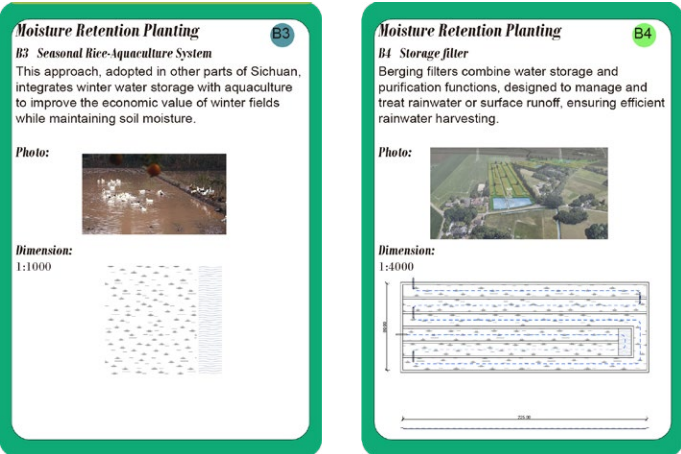
During the normal period, the space is enhanced with lighting installations, while vegetation creates a semi-enclosed environment. Visitors can enjoy lakeside views while picnicking.

(Fig 7.35; 7.36).

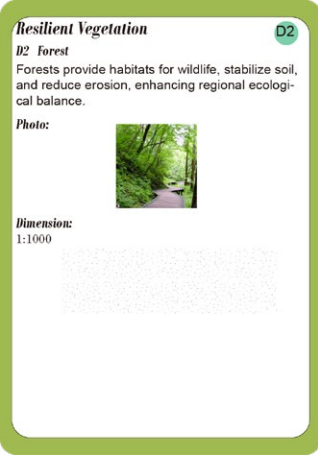
7.3 Visions at regional scale

7.3.1 Patterns added

Moisture Retention Planting



Resilient Vegetation



The current combination of patterns lacks functionality in terms of water retention and water storage.

The new pattern mapping transforms the Renmin Weir from a Concrete Ditch into a Natural Ditch and conceptually adds a Buffer Zone for intervention.

Based on the shortcomings of the existing patterns, additional patterns have been incorporated from a top-down approach, such as Storage Filter, Seasonal Rice-Aquaculture System, Resettlement, and Floodplain.

The new pattern groups aims to enhance the capacity for water retention, water storage, and water conservation at the regional scale, while also creating room for the river (Fig 7.37; Fig 7.38).

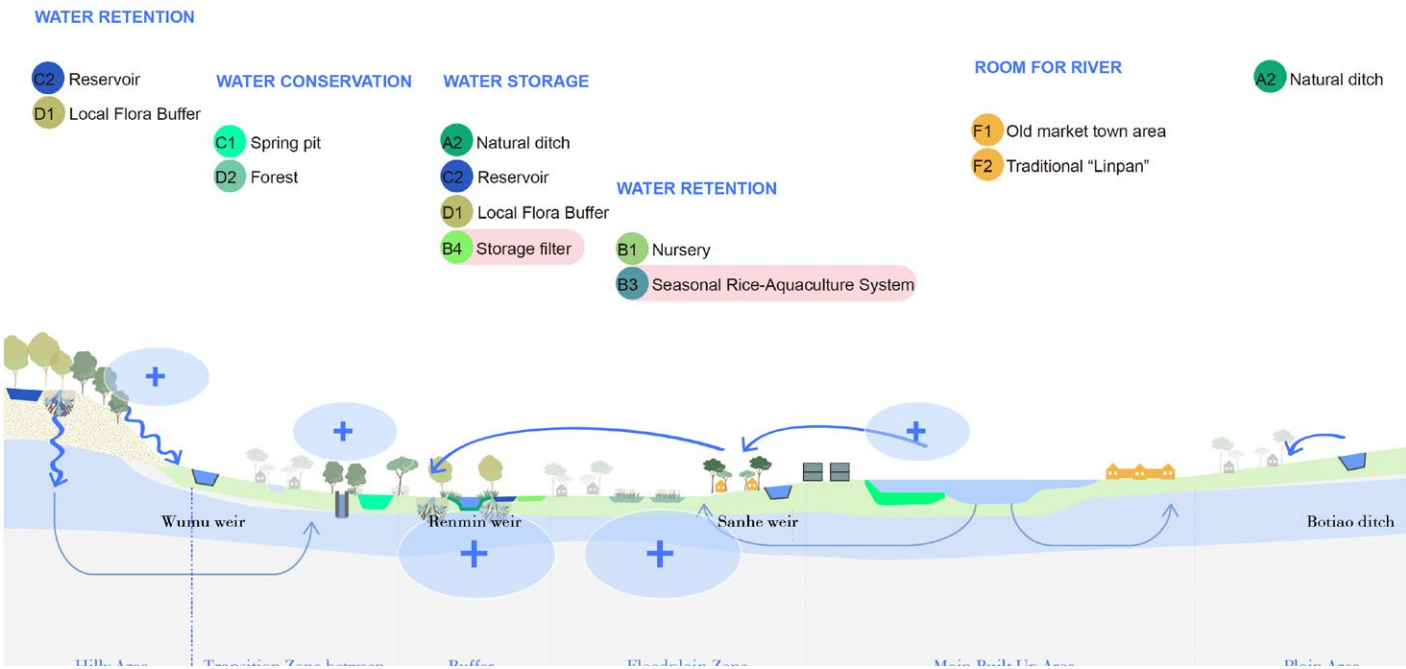
7.3.2 The result

The Buffer Zone :The Buffer Zone currently contains the Renmin Weir in the form of a concrete ditch. By converting the Renmin Weir into a Natural Ditch, the soil's water retention capacity can be restored. Additionally, On-field reservoirs and Storage Filters are placed along the riverbanks to store excess water during the flood season. The Local Flora Buffer can serve as a buffer during both flood and drought seasons (Fig 7.39).

The Hilly Area:In the Hilly Area, the soil consists of highly permeable sandy soil.By introducing a Local Flora Buffer, the soil's water retention capacity is enhanced, increasing surface runoff flowing into the plains (Fig 7.40).

The Transition Zone Between Hills and Floodplains:In the Transition Zone Between Hills and Floodplains, the site contains many spring pits that serve as groundwater sources. By implementing Grain-for-Green initiatives, converting farmland into forests, the groundwater source areas are protected, and their ecological value is restored (Fig 7.41).

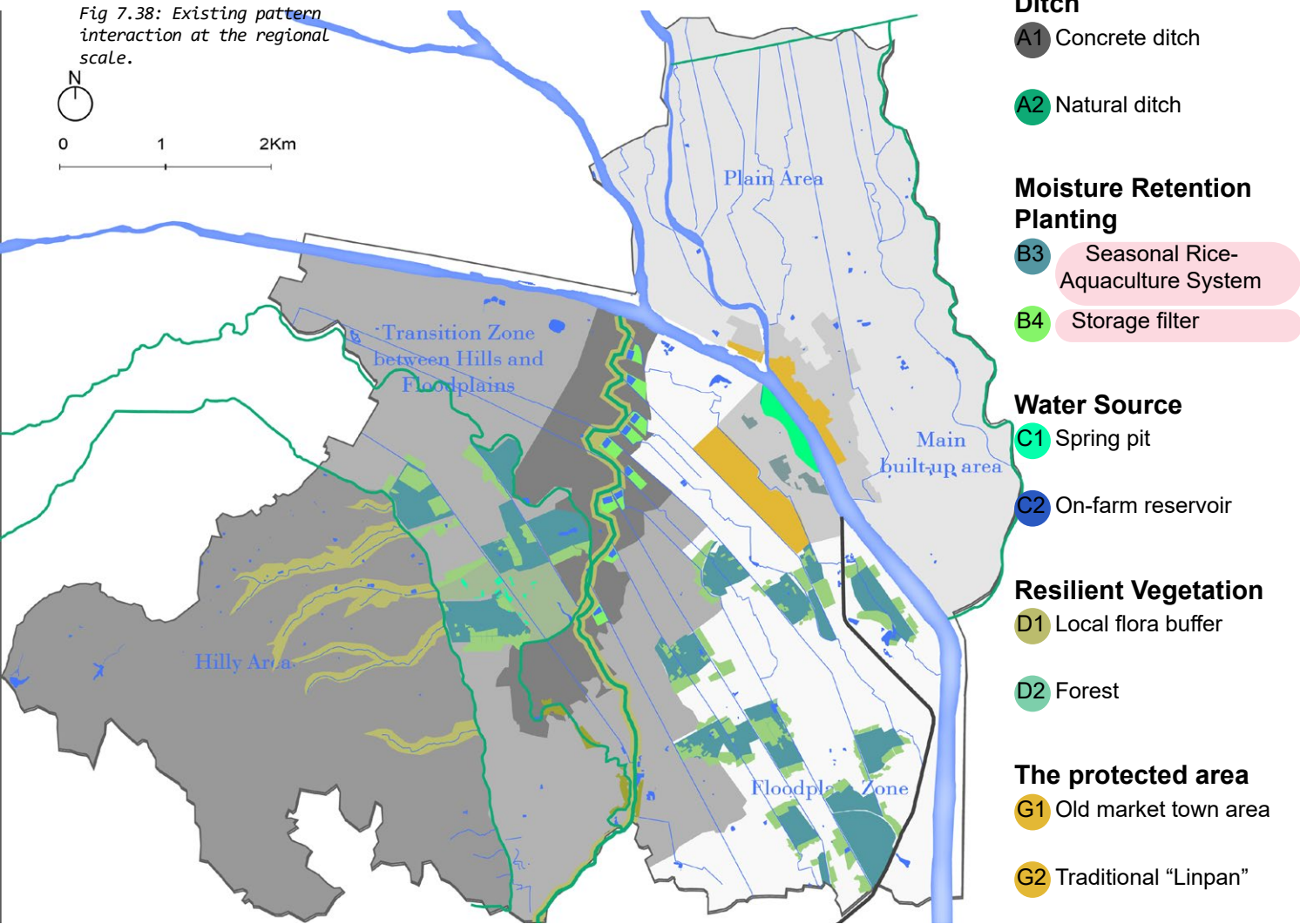
Fig 7.37: Existing pattern interaction at the regional scale.



The Floodplain Zone:In the Floodplain Zone, the low-lying areas contain Seasonal Rice Fields. Transforming these fields into a Seasonal Rice-Aquaculture System can enhance soil water retention capacity. Additionally, nursery fields are arranged around these areas to mitigate the adverse effects of excessive water on the soil (Fig 7.42).

The Main Built-Up Area: In the Main Built-Up Area, there are the protected Old Market Town Area and Traditional Linpan. Through Resettlement and the creation of Floodplains, more space is allocated for the river, thereby safeguarding these historically valuable areas.

Fig 7.38: Existing pattern interaction at the regional scale.



The Buffer Zone

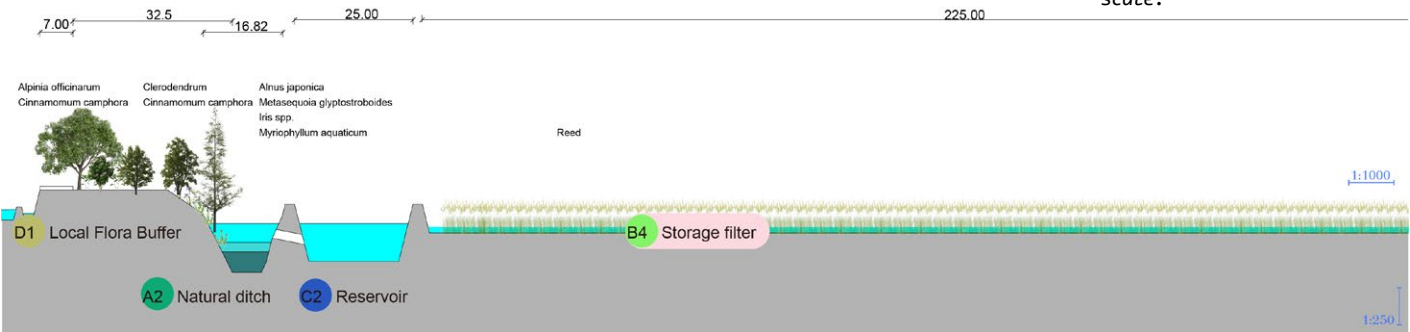


Fig 7.39: Existing pattern interaction at the regional scale.

The Hilly Area

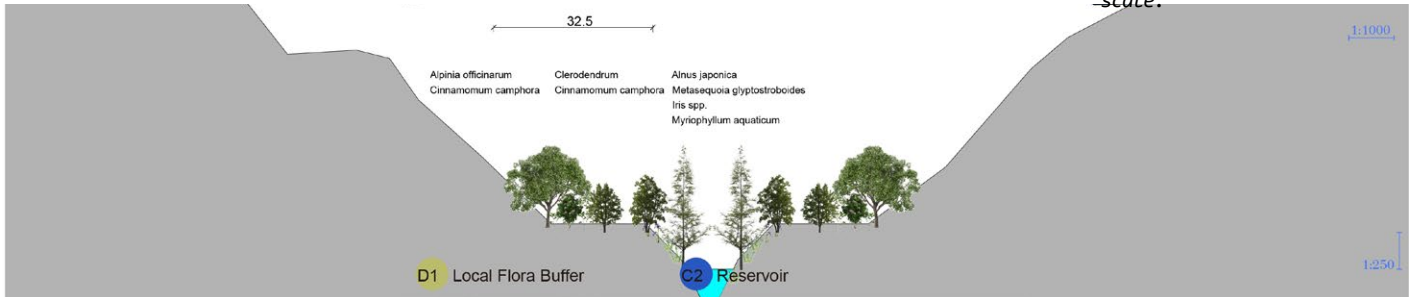


Fig 7.40: Existing pattern interaction at the regional scale.

The Transition Zone Between Hills and Floodplains

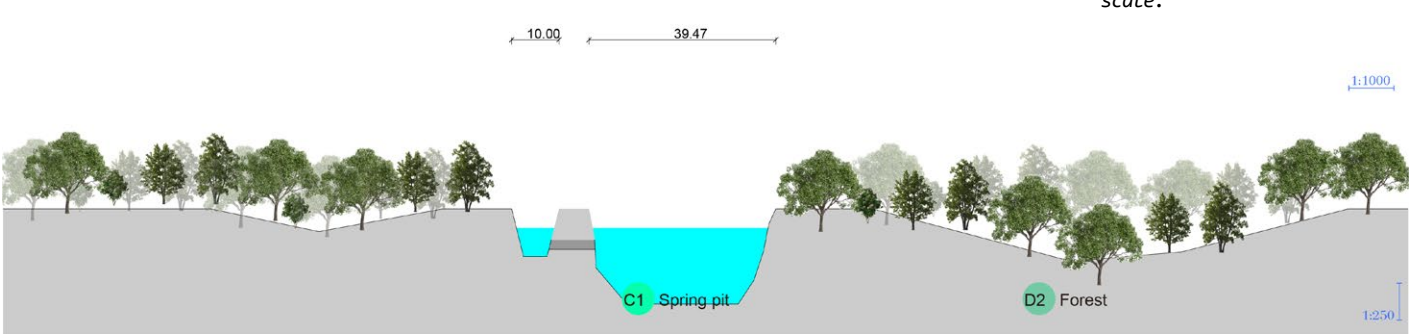


Fig 7.41: Existing pattern interaction at the regional scale.

The Floodplain Zone



Fig 7.42: Existing pattern interaction at the regional scale.

7.4 Conclusion & discussion

7.4.1 Conclusion

This integrated design framework for Yuantong Town harmonizes top-down morphological strategies and bottom-up pattern language methodologies to address climate adaptation while reinforcing the landscape’s cultural identity. By synergizing systemic planning with localized human experiences, the project answers the main research question—How to redesign waterfront spaces for the festival along Xi River in Yuantong town through climate adaptive water management considering the identity of landscape?—through the following subquestion-driven approaches:

1. Top-down Morphological Approach: structuring systemic resilience

The regional and town-scale interventions employed a top-down strategy to establish hydrological coherence and spatial hierarchy:

Climate-Adaptive Infrastructure: At the regional scale, the transformation of the Renmin Weir into a natural ditch, coupled with buffer zones and seasonal rice-aquaculture systems, restored water retention and groundwater recharge. These systemic interventions addressed permeable sandy soils in hilly areas and protected spring pits through Grain-for-Green initiatives.

Spatial Reconfiguration: At the town scale, floodplains and resettlement strategies created “room for the river,” balancing flood discharge with recreational and cultural functions. The fish-shaped hub and bamboo cage weirs exemplify how traditional techniques were scaled up to modern hydrological needs.

Temporal Zoning: Seasonal land-use planning—such as rapeseed fields blooming during festivals and floodplains transitioning between agrarian, recreational, and flood-mitigation roles—embedded climate resilience into the landscape’s identity.

2. Bottom-up Pattern Language Approach: activating human-scale interactions

The human-scale design leveraged pattern language to revive socio-cultural connections and spatial legibility:

Restoring Historic Patterns: Lost traditions like the even-day

market and gravel land festivals were reintroduced through squares, demountable stalls, and pontoon bridges. These patterns reconnected festivals to the river, using spatial forms (e.g., shaded chat areas, dining-viewing spaces) to facilitate social rituals.

Hybrid Pattern Combinations: At the waterfront, “Interactive Space + Living with Water” composites (e.g., meditative enclaves with scenic dining) balanced vibrancy and tranquility. The gravel land’s dual role—ecological sanctuary and festival stage—demonstrated how patterns adapt temporally to hydrological and cultural cycles.

Material and Ecological Narratives: Permeable parking lots, bamboo-reinforced structures, and reclaimed stone paving echoed traditional craftsmanship, while submerged wooden stakes and herbaceous regeneration made hydrological processes visible.

3.Synthesizing approaches to answer subquestions

Subquestion 1: What water management techniques can be considered to restore the river's climate adaptability ?

Answer: A hybrid of traditional (bamboo cage weirs, seasonal aquaculture) and modern (buffer zones, permeable parking) techniques enhanced water retention, flood mitigation, and groundwater recharge. Systemic interventions at regional scales (e.g., naturalized ditches) worked synergistically with town-scale floodplains and gravel lands to create adaptive “sponges” for the river.

Subquestion 2: How do the form of waterfront public spaces benefit the new water management and facilitate the connection between festival and river?

Answer: The form of public spaces—such as embankment, pontoon bridges for temporary access, and seasonal rapeseed fields—physically and symbolically tied festivals to the river’s seasonal rhythms. Flexible infrastructures (demountable stalls, adjustable bridges) allowed spaces to transition between daily use and festival modes, reactivating historical rituals in contemporary contexts.

7.4.2 Discussion

Subquestion 3: How to enhance spatial experience to reveal the interaction between people and the river now and in the past?

Answer: Layered narratives—through material palettes, interpretive elements (e.g., flood markers), and programmed activities (e.g., vendor demonstrations)—made past and present interactions legible. Meditative spaces encouraged reflection on ecological cycles, while hybrid zones (e.g., picnic areas with reclaimed stone seating) fostered daily engagement with the water's edge.

By interweaving top-down hydrological structuring with bottom-up socio-spatial patterns, the project positions climate adaptation not as a technical fix but as a cultural practice. The restored gravel land, seasonal rapeseed fields, and bamboo-reinforced embankments became both ecological assets and identity markers, ensuring that water management strategies are inseparable from the town's heritage.

The morphological approach provided the systemic backbone for resilience, while the pattern language method ensured that every intervention resonated with human experiences and historical memory. Together, they transformed the river from a hazard into a dynamic, identity-defining element.

In a broader context, this project is not merely a technical or landscaping intervention; it represents a holistic strategy that intertwines ecological, cultural, and social dimensions:

Global climate change and water resource management

With the increasing frequency of extreme rainfall and drought events under global climate change, traditional water management practices face significant challenges. The design case of Yuantong Town demonstrates an effective strategy by enhancing the natural channel's water retention capacity, integrating rainwater harvesting features, and combining traditional with modern techniques. This approach offers a sustainable, low-carbon model applicable to water management challenges globally.

Local cultural identity and urban renewal

As rapid urbanization erodes historical features and a sense of place, the project reasserts the cultural identity of the old town by reactivating historic markets, river-based festivities, and traditional spatial practices. Revitalizing these collective memories not only fosters a sense of belonging among residents but also transforms the waterfront into a dynamic cultural and economic hub, aligning urban renewal with cultural preservation.

Design methodology and multi-scale coordination

The integration of top-down planning with bottom-up community input illustrates a synergistic design process. A structured morphological analysis, combined with in-depth investigations of everyday spatial patterns, provides a balanced framework for addressing complex issues. This method of blending systematic hydrological interventions with human-centric spatial experiences offers an innovative pathway for future urban and landscape planning.

In conclusion, the project reframes the Xi River not as a hazard but as an essential and dynamic element of place identity. The combination of traditional water management wisdom with contemporary design interventions transforms the waterfront into a resilient cultural asset. The morphological approach provides a solid framework for hydrological resilience, while the pattern language method ensures each intervention resonates with lived human experiences and historical continuity. Together, these strategies guide the creation of a waterfront space that is both functionally robust and rich in cultural significance, offering valuable insights for global urban design in the face of climate

08

Reflection

8.1 Relation between project topic, master track, and programme

My graduation project, "Redesigning Waterfront Spaces Along Xi River in Yuantong Town," aligns closely with the Landscape Architecture (LA) track within the MSc A+BE programme. The project integrates core landscape principles such as climate-adaptive design, cultural identity restoration, and spatial experience enhancement. These principles embody the programme's interdisciplinary ethos of combining historical, ecological, and social dimensions to create sustainable and meaningful landscapes. The focus on adaptive water management directly supports the programme's emphasis on addressing contemporary global challenges, such as climate change and cultural preservation.

8.2 Research and design interplay

Research and design were deeply interwoven throughout this project:

- Research's Influence on Design: Methods like landscape biography and pattern language provided historical, cultural, and ecological insights, shaping the conceptual framework. For example, understanding the traditional Dujiangyan irrigation system informed the integration of adaptive water management techniques.

- Design's Influence on Research: The iterative design process, such as reimagining festival spaces, raised new questions about how these spaces can foster a connection between community identity and environmental sustainability, refining the scope of my research.

This dynamic relationship ensured a feedback loop where theoretical insights were continuously tested and refined through practical design applications.



Fig 8.1: Seasonal rapeseed field at the west bank of the Xi River in the past



Fig 8.2: Seasonal rapeseed on the designed floodplain

8.3 Assessment of the approach, methods, and methodology

Evaluation of the approach

My methodology, combining Top-down Morphological Approach and Bottom-Up Pattern language Approach has largely been effective in addressing the challenges of climate change adaptation, site identity restoration, and festival space enhancement. The Top-down Morphological Approach provided a solid structural framework for climate-adaptive water management and festival infrastructure. For example, the morphological approach creates the floodplain and utilizes embankments, weirs, fish-ship hubs, and revetments to ensure the entire water system operates across different seasons. In contrast, through pattern language studies, the bottom-up approach allows for the integration of community practices and local usage patterns into the design. The "seasonal rapeseed field" pattern reflects a local practice of cultivating vacant riverside spaces (Fig 8.1). Its application enhances the floodplain's local identity and climate adaptability (Fig 8.2).

While the integration of these methods created a comprehensive design, challenges arose in balancing the two approaches. My approach revealed that design is not a linear process. While the Morphological Approach and Pattern language Approach methods provided a structured framework, in practice, these steps often overlapped and required iterative adjustments. It was challenging to adhere to a fixed sequence. In the phase of selecting patterns and conducting individual research, modifications were often necessary. Patterns that were not applicable were removed, while new patterns were added as the design evolved. For instance, when conducting detailed design at the human scale, I found a lack of local pattern language. I introduced a new pattern type called "Living with Water," which includes "Waterfront Wandering," "Waterfront Picnic," "Meditative Space," and "Viewing Space." The addition of these patterns helps achieve the design goal of strengthening people's interaction with the river.

This process highlighted that while Pattern Language provides a robust bottom-up framework, it must be constantly integrated with top-down thinking to ensure relevance and adaptability to broader goals. The interplay between these approaches made the design process inherently iterative and interdependent, with each method influencing and refining the other, rather than progressing in a linear manner.

Incorporation of mentor feedback

The feedback from my mentors emphasized the need for stronger connections between theoretical frameworks and practical applications. Suggestions included:

1. Combining Pattern Language and Morphological Approach

One significant piece of feedback was the suggestion to combine Pattern Language with the Morphological Approach, reflecting the dual nature of my project. Festivals represent a living space, emphasizing how people interact with and use the space, while the gravel land in the river represents a distinct physical form as the festival venue. This feedback was instrumental in shaping my methodology, allowing me to explore both the spatial patterns of human behavior and the physical restoration of the festival ground.

2. Improving Diagram Legibility

Another key recommendation was to enhance the legibility of pattern language diagrams. This involved explicitly showing how people use the space, including details like specific dimensions and scales. In response, I revised the diagrams to include these elements, making them more accessible and practical.

3. Systematic Problem Solving with Pattern Hierarchy

My mentors emphasized the importance of systematically categorizing patterns into different levels. Following this feedback, I reorganized the pattern system into hierarchical layers: regional-scale patterns (e.g., Seasonal Rice-Aquaculture System), town-scale patterns (e.g., The even days market), and human-scale patterns (e.g., Street Kitchen). These patterns solve different problems on different scales. This helped clarify how patterns interact across scales and contributed to a more coherent design strategy.

4. Addressing Feasibility

My mentors advised considering specific plant species suitable for local conditions. I addressed this by selecting native species with high drought or flood resistance and ecological value. For example, choosing local deep-rooted plants such as *Metasequoia glyptostroboides* can stabilize the soil and maintain humidity. The integration of this feedback improved both the depth and clarity of my project. By addressing how people interact with

space and emphasizing feasibility and systematic organization, my design evolved to better reflect the site's unique identity and socio-environmental conditions. This iterative feedback process has also deepened my understanding of the living space concept and its integration with physical forms.

8.4 Academic and societal value, scope, and ethical aspects

This project contributes both academically and socially:

- Academic Value: It addresses multiple challenges, including climate change, site identity, and festival dynamics, while employing a dynamic and flexible waterfront design to meet complex demands.

- Social Value: By responding to climate change and restoring cultural identity, the project brings tangible benefits to the Yuantong community, enhancing resilience and fostering a stronger sense of place.

- Ethical Considerations: The project integrates a morphological approach and pattern language approach, ensuring that respect for local traditions and community engagement forms the foundation of the design process. This approach guarantees that the proposed interventions reflect the values and needs of the local population.

8.5 Transferability of project results

The methodologies and insights developed in this project are highly transferable:

- Climate-Adaptive Water Management: The combination of traditional and modern techniques offers a replicable model for regions facing similar environmental challenges.
- Cultural Restoration: The emphasis on integrating cultural identity into landscape design provides a framework applicable to other heritage sites.
- Pattern Language Approach: The adaptable nature of pattern language allows it to be tailored to various social, ecological, and cultural contexts, enhancing its utility for diverse design projects.

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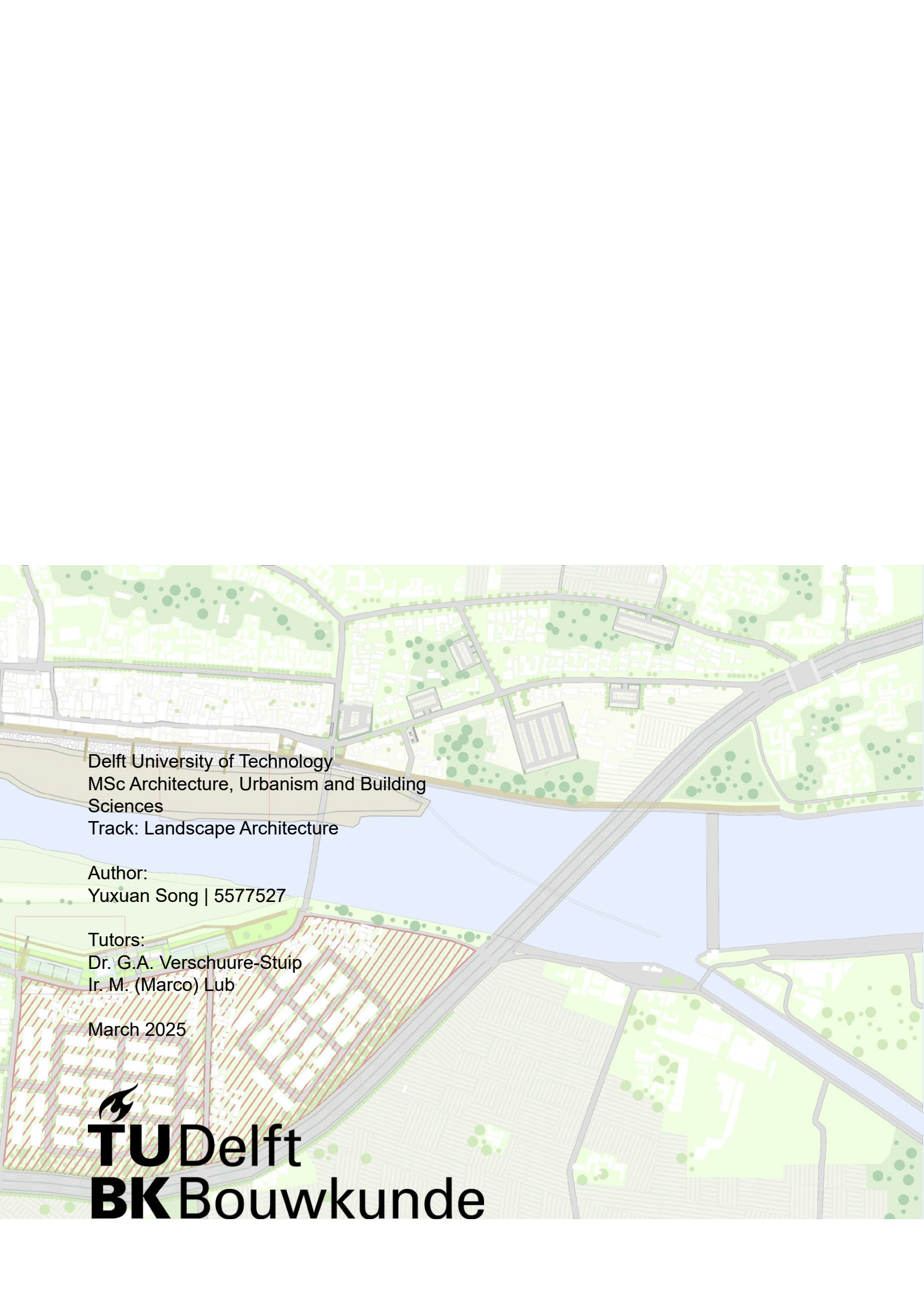
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