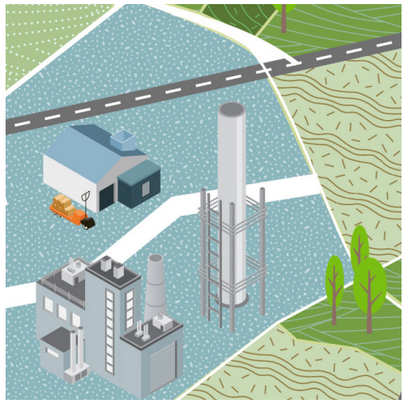

SMART SHRINKAGE 3.0: Suihua's Tridimensional Regeneration

Transforming vacancies into value through the integration of farming systems and adaptive reuse

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Delft University of Technology

Faculty of Architecture and the Built Environment

Graduation Lab: Planning Complex Cities

MSc: Urbanism I 2024/2025

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P5 Report
June, 2025

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01 INTRODUCTION

1.1 MOTIVATION

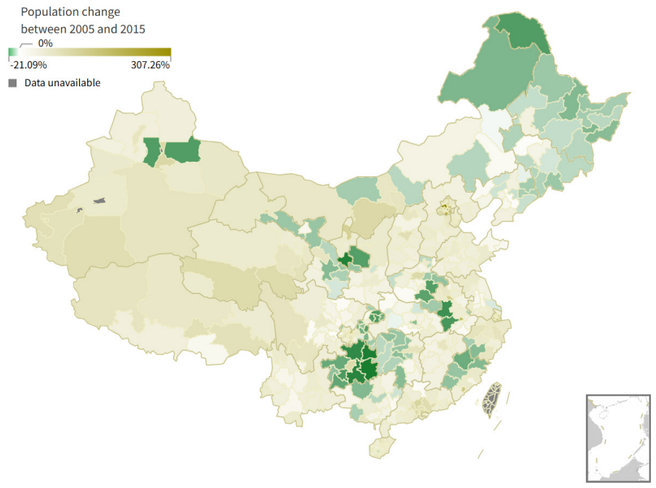


Figure1: The Population change between 2005 and 2015 in China
Source: interaction.sixthtone.com, shrinking-cities

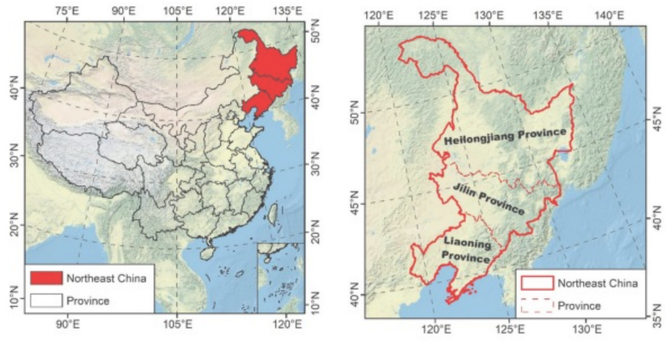


Figure 2: The geographical location of the Three Northeast Provinces (Dongbei).
Source: (Chen et al, 2024)

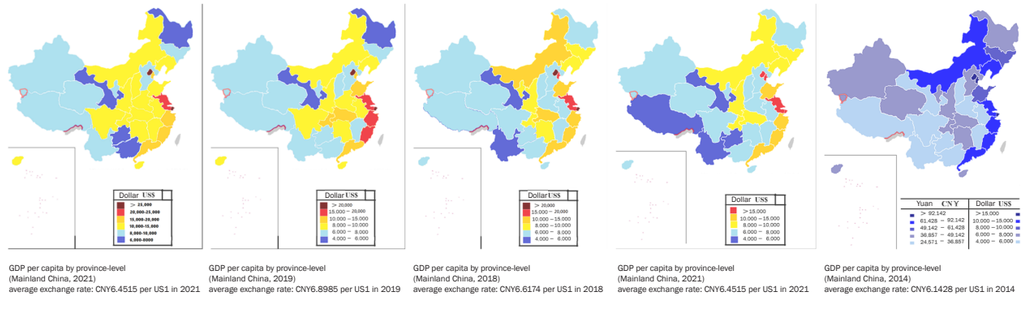


Figure 3: Per capita gdp of Chinese provinces in 2021, 2019, 2018, 2017, 2014
Source: WIKI

Currently, the global population is declining, a trend observed in both developed and developing countries. Northeast China, once a thriving industrial hub, is now facing severe urban shrinkage. Despite widespread attention and academic discussion, strategies to address this issue remain lacking in flexibility and comprehensiveness. Research indicates that 68 cities in China have experienced continuous shrinkage since 1990, with the majority located in the northeastern region.

The Northeast Revitalization initiative has primarily focused on the economic development of central metropolitan areas. Since 2003, the central government has invested significant funds into the region's economic growth, yet its overall economic performance remains among the lowest in the country. The region continues to suffer from substantial population loss, and the issue of vacant housing is particularly pronounced in Heilongjiang Province, situated in the far north.

The concept of urban shrinkage was first introduced by Häußermann et al. in 1988 in an empirical study of the Ruhr area in Germany, where ongoing de-industrialization led to population and economic decline. This concept has since been widely accepted and applied to describe the phenomenon of population loss, economic downturns, and the associated outflow of development elements such as population, investments, and businesses in cities or metropolitan areas, either as a whole or in parts.

Urban shrinkage is a multifaceted issue that spans various fields. If the nature of shrinkage is not fully understood, and if economic stimulation remains the primary strategy for managing shrinking cities, it could lead to numerous challenges and may not ensure success. I believe that vacant land and housing also present opportunities, including spaces for investing in green infrastructure that can provide ecosystem services and support sustainable urban development. While shrinkage brings many challenges, it also offers a chance to replan cities.

Therefore, it is crucial to adopt a balanced and long-term perspective on urban revitalization, addressing both the positive (e.g., ecosystem resilience) and negative (e.g...., economic resilience) impacts that shrinkage can have on a city (Chen, 2024; Sun, 2024). By integrating these approaches, shrinking cities can explore innovative pathways to enhance resilience and sustainable development.

51.3% Petroleum

Source: news.CCTV(2021)

93% Steels

Source: Jingjidaokan(2014)

Coal
49%
National Production

Source: SOHU(2022)

Planned Economy Era

1957

Northeast China is rich in mineral resources. At the beginning of the establishment of the People's Republic of China, the region was prioritized for development, and many large state-owned industrial enterprises were established, producing grain, steel, timber, coal, and electricity.

Source: SOHU(2022)

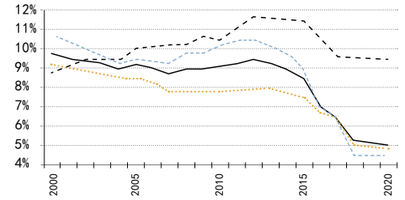
Source: Dashangu

Due to excessive mining, the forest ecosystem in Yichun has been destroyed. The signs of resource depletion in coal mining areas such as Hegang have become increasingly severe. In addition, due to excessive mining, occasional subsidence of road surfaces occurs. Many local coal mines went bankrupt.

1985

The government promoted **Market-oriented Economic Reform**, and the southeastern coastal cities developed rapidly.

In contrast, during the same period, large state-owned enterprises in Northeast China were of low quality, inefficient, and lacked competitiveness.



Data based on National Bureau of Statistics

Dongbei's GDP share of the national total

primary sector's share of the national total

secondary sector's share of the national total

tertiary sector's share of the national total

As the gap between regions continues to widen, a large number of people from Dongbei have migrated to other regions in search of job opportunities and living space. The region has experienced severe population loss, and the phenomenon of urban shrinkage is becoming increasingly pronounced.

1995 Planned Economy Officially Ended

03/08/1986, Shenyang Explosive Equipment Factory was declared bankrupt, becoming the first state-owned enterprise in the People's Republic of China to go bankrupt.

Source: SOHU(2018)

After the reform and opening-up, state-owned enterprises in Northeast China began privatization reforms and entered the market economy, but they struggled in the face of market competition. More than half of the large state-owned enterprises incurred serious losses.

Figure 4: Historical line, Made by author
Data based on: SINA News, 从辉煌到衰落，东北到底发生了什么

1.3 THE NEGATIVE POPULATION INERTIA VALUE

case study area selection

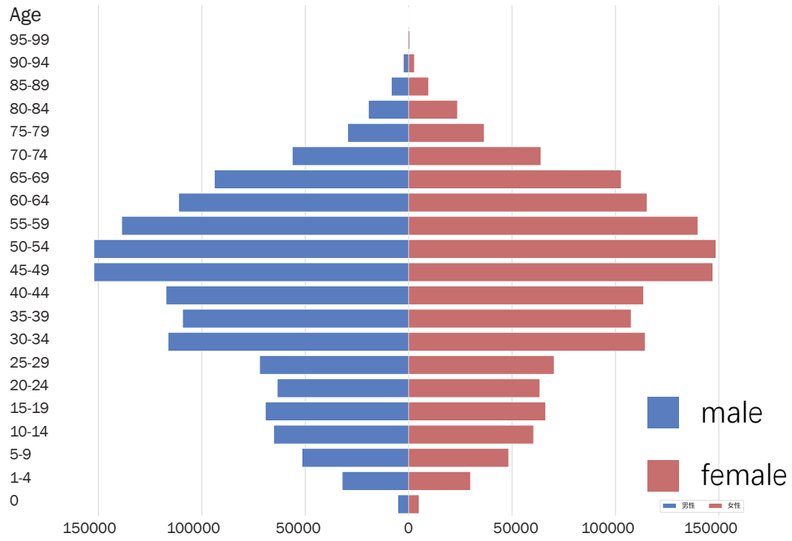


Figure 5: Heilongjiang population by age and sex 2020
Statistical data based on the Seventh National Population Census

Figure 6: People at Shanghai Railway Station are preparing to return home for the Chinese New Year. Source: Xinhua News Agency(2020)

According to scholars' predictions (Zhang & Wang, 2023), the continuous population decline in Heilongjiang is a trend that is difficult to reverse. Firstly, as the province with the most severe population decline in China, Heilongjiang has experienced a negative natural population growth rate since 2015, which reached -5.11‰ in 2021. The main reasons for this are its extremely low fertility rate (only 0.76) and the ongoing decrease in births. In 2021, Heilongjiang's birth rate was just 3.59‰, significantly below the national average.

Secondly, the issue of population outflow has further exacerbated the population decline. Heilongjiang faces the most severe net outflow of residents in Northeast China, accounting for nearly 50% of the total outflow in the region. In 2020 alone, 4,365,700 people left Heilongjiang, representing 13.77% of the province's total population. Limited employment opportunities and a single industrial structure have driven a large number of young and middle-aged workers to migrate, leading to an increasingly aging population within the province. This issue is particularly acute in rural areas, where more than half of the population is aged 50 and above.

From the perspectives of population inertia and intrinsic growth rate, Heilongjiang has entered an irreversible stage of negative growth. The province's long-term ultra-low fertility rate (a total fertility rate of only 0.76) and a high proportion of aging population (15.61% aged 65 and above) have resulted in a significantly negative population inertia value (2020, M = 0.689). This indicates that even a substantial increase in fertility rates would not be enough to restore population levels.

The value of population inertia (M) is determined by fertility rates, age structure, mortality rates, and migration patterns.

M > 1, population inertia is positive, indicating population growth.
M = 1, population inertia is neutral, signifying a stable population.
M < 1, population inertia is negative, meaning that even if fertility rates recover to replacement levels, the population will continue to decline for a period. This is often associated with aging populations and a low base of childbearing-age individuals.

1.4 CASE STUDY AREA--SUIHUA

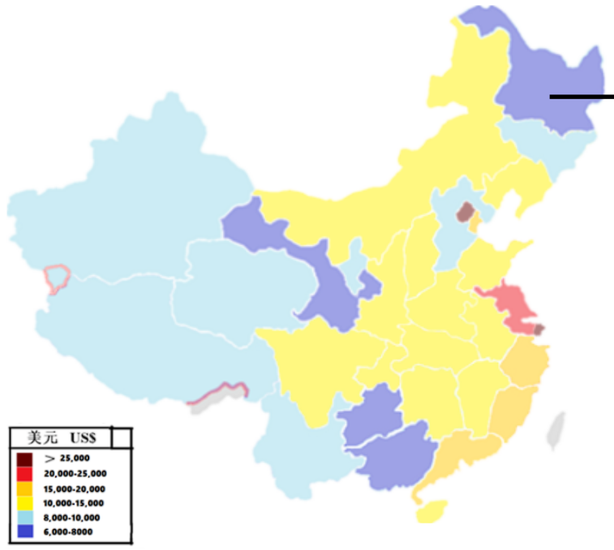


Figure 7: Per capita gdp of Chinese provinces in 2021
Source: WIKI

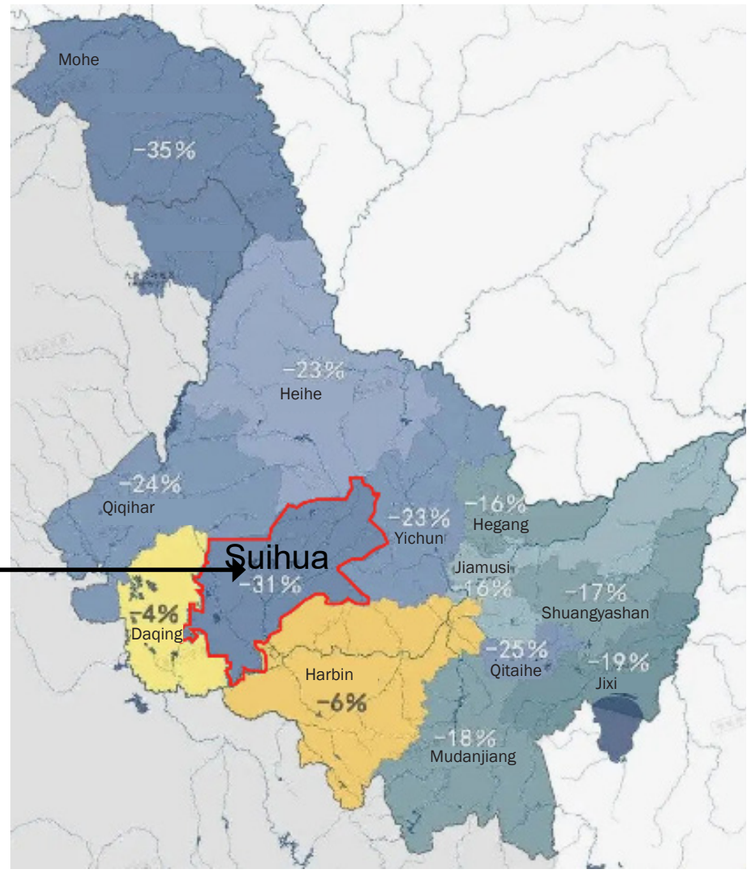


Figure 8: Compared to 2010 (the Sixth National Population Census), Heilongjiang Province experienced a significant population loss in 2020 (the Seventh National Population Census).

Source: National Bureau of StatisticsNational Development and Reform Commission. (2016)

Between 2010 and 2020, Suihua experienced the highest population loss among cities in Heilongjiang Province, making it a compelling case study area. By analyzing Suihua, this study aims to uncover the root causes of urban shrinkage and explore sustainable development strategies applicable to other shrinking cities.

1.5 POLICY BACKGROUND

1.5.1 Regional Planning and Collaboration

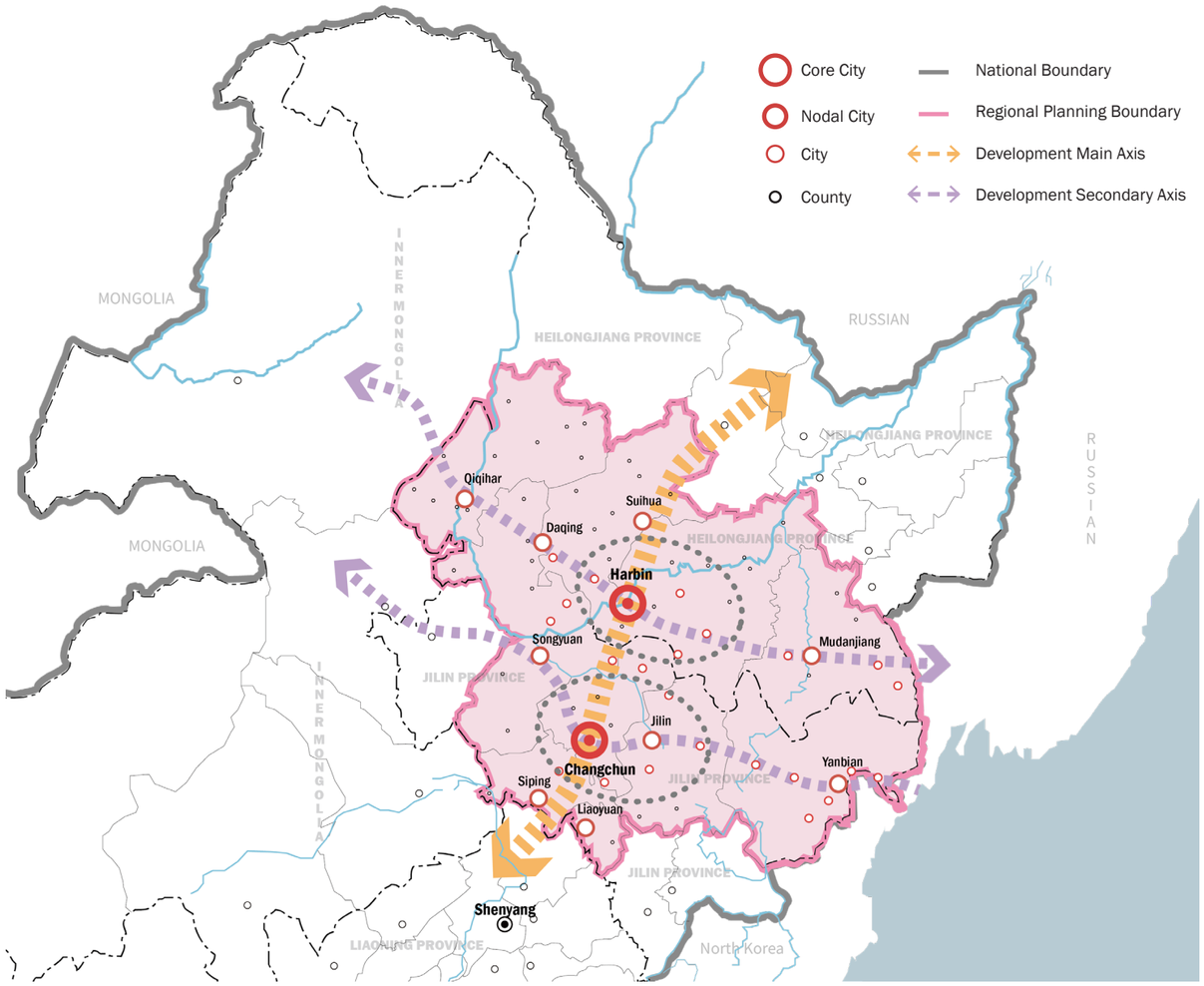


Figure 9: Political Regional Plan
Made by author, Data based on National Bureau of StatisticsNational Development and Reform Commission. (2016)

Functional positioning of nodal key cities

Daqing: petrochemical industry base, equipment manufacturing base, new materials industry base.
Qiqihar: heavy equipment manufacturing base, green food base, ecological tourism base.

Suihua: green agricultural products processing and logistics distribution base, cold black earth ecological liveable city.

Mudanjiang: bridgehead of Heilongjiang-Russia co-operation, famous city of international leisure and northern landscape tourism.
Suifenhe: regional trade and logistics centre, model city for opening up to Russia.
Jilin: advanced manufacturing base, leisure-oriented tourist destination in Northeast Asia.
Songyuan: grain and livestock production and processing base, green industry city and ecological liveable city.
Siping: a green industry and logistics distribution base, and a demonstration area for regional co-operation in Mongolia, Jilin and Liaoning.
Liaoyuan: green industry and logistics distribution base.
Yanbian: Tumen River Regional Cooperation and Development Pioneer Area and Ecological Civilisation Demonstration Area.

In the regional plan for Northeast China, Suihua is positioned as a **secondary city** within the Harbin-Changchun urban cluster. Development resources and opportunities are primarily allocated to Harbin and Changchun, the core metropolitan centers. Even in Northeast China, a region severely affected by population loss, Suihua lags behind other cities in development potential, with its economy primarily reliant on the primary sector. In contrast, neighboring cities are designated as chemical or industrial hubs. This positioning further limits Suihua's growth prospects, making it difficult for the city to achieve prosperity. Within the framework of the Harbin-Changchun urban cluster, Suihua is classified as a peripheral city rather than a key economic center. The prolonged stagnation of its economic status exacerbates population outflow, rendering Suihua's goal of achieving population growth increasingly unattainable.

1.5 POLICY BACKGROUND

1.5.2 Governments Facing Shrinkage Cities

In the 'Key Tasks for the Construction of New-Type Urbanization in 2019,' released by the National Development and Reform Commission (2019), the concept of "shrinking cities" was introduced for the first time. The policy clearly outlines the need to optimize urban layout and promote coordinated development across large, medium, and small cities. **For shrinking small and medium-sized cities like Suihua, the policy advocates for a strategy of "downsizing and strengthening,"** which involves shifting away from traditional growth-driven planning. This strategy emphasizes reducing unnecessary expansion while improving and optimizing existing resources and infrastructure to enhance efficiency and sustainability. It focuses on making better use of what is already available, and guiding both population and public resources toward urban centers. This approach aims to avoid large-scale expansion, focusing instead on better utilizing the existing urban resources to enhance operational efficiency.

Additionally, the policy emphasizes strengthening these stability of **border cities** by directing public resources towards these areas, promoting the **equal distribution of public services**, and **providing targeted support**. It also calls for accelerating the urbanization of the rural population, particularly focusing on agricultural migrants, and encourages respecting their autonomy and choices, ensuring that these groups have equal access to urban public services. Furthermore, the 'Five-Year Action Plan for the In-depth Implementation of a People-Centered New-Type Urbanization Strategy' (State Council of the People's Republic of China, 2024) continues to emphasize these principles. The plan emphasizes a people-centered approach, with the integration of rural populations into urban areas as a priority. It aims to improve the provision of basic public services at residents' permanent places of residence, guarantee educational rights, and enhance the housing security system. Furthermore, the plan sets a target for the urbanization rate of China's permanent population to reach nearly 70% over the next five years.

1.5.3 Urbanasition Problem

"Enhancing Suihua's capacity to attract and retain population, particularly by drawing in residents from surrounding rural towns," is a key focus of the policy, which explicitly advocates for guiding rural populations to migrate to urban areas. However, rural migrants are often a vulnerable group in society, and their welfare is frequently not adequately ensured after moving to cities. Therefore, the policy emphasizes the need for housing and employment security plans for these relocated rural populations.

Challenges: Suihua faces limited appeal to populations from surrounding rural areas and is further threatened by the siphoning effects of Harbin and Daqing, making it susceptible to population loss.

Protecting arable land is also a critical component. The organic matter content and retention of black soil in Heilongjiang are decreasing year by year, necessitating technological innovation and a shift to more sustainable farming practices. For example, promoting intensive, efficient, and ecological agriculture is essential for strengthening the protection and utilization of black soil and optimizing the ecological functions of farmland. However, the current smallholder economy poses obstacles to such changes (Du, 2018).

The migration of rural populations to urban areas facilitates the transformation from smallholder economy to the intensification and mechanization of rural land use, and improving agricultural productivity and resource efficiency (Huang et al., 2012). However, this study focuses on smart shrinkage strategies for Suihua's administrative district. Therefore, issues such as technological innovation in farming practices, changes in cultivation methods, and the reorganization of land resources will not be explored in depth in this section.

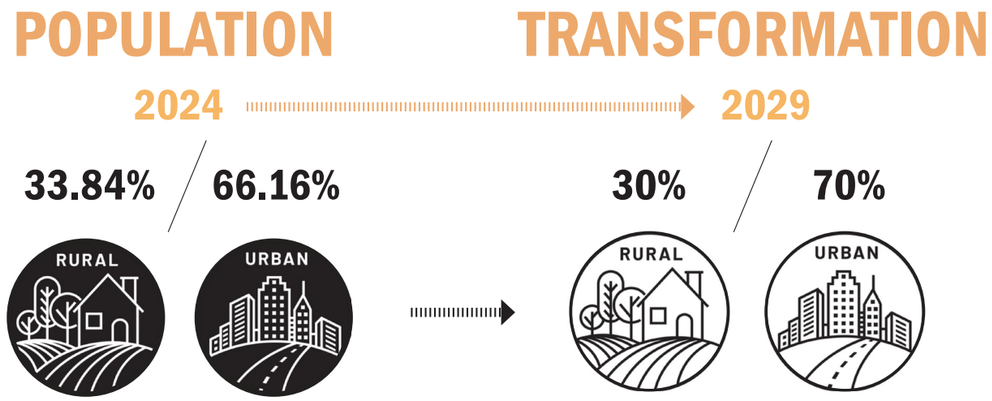


Figure 10: China's Urbanization Goals
Source: National Bureau of Statistics, National Development and Reform Commission

Figure 11 Chinese Cities in Urbanization
Author:@Feng Jin. mpweekly.com

Figure 12 An elderly woman is growing vegetables at a construction site. Her land was expropriated, but she has not received resettlement housing.
Author:@Feng Jin. mpweekly.com

1.5 POLICY BACKGROUND

1.5.4 Loss and Conservation of Black Soil

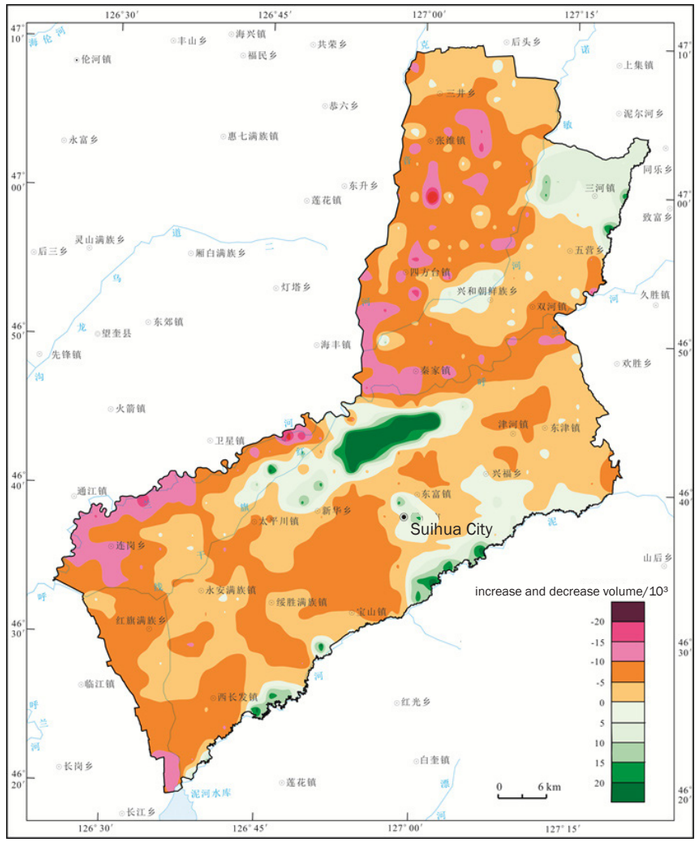


Figure 14: Changes of soil organic matter contents in the past 30 years in Beilin District, Suihua City. (Yang, 2022)

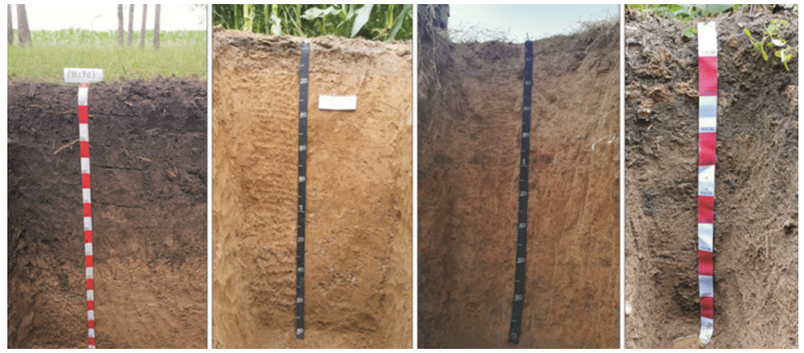


Figure 15: Photographs of soil profiles (kai,2022)

The thick mollic epipedon (or humus layer) is one of the most essential characteristics of black soil, with its thickness reflecting soil development degree and serving as a key field indicator of soil fertility. Simultaneously, changes in mollic epipedon thickness provide critical insights into black soil degradation (Kai et al., [year]).

Multiple studies have documented significant declines in the mollic epipedon thickness of Heilongjiang's typical black soils since cultivation began, with ongoing rapid losses. Shen et al. (2003) found through regional surveys that black soils are losing 0.7–1 cm annually, with thickness reduced from initial 80–100 cm to merely 20–30 cm in some areas. Similarly, Liu (2003) reported that typical black soil regions lose 0.3–1 cm of topsoil yearly, with average thickness decreasing from 60–70 cm in the 1950s to 20–30 cm presently.

The degradation of black soils involves not only quantitative loss but also qualitative decline. Yang (2022) synthesized data from 1992 to 2022, revealing a rapid decrease in organic matter content within the mollic epipedon. These findings underscore the urgency of black soil conservation efforts.

1.5 POLICY BACKGROUND

1.5.5 Reform of the agricultural system

Disappearing Villages in Suihua

2019

Figure 16
Source: Google satellite map, 2019

2020

Figure 17
Source: Google satellite map, 2020

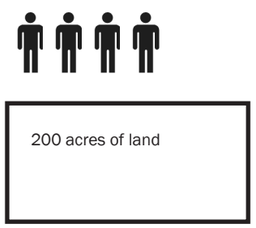
2024

Figure 18
Source: Google satellite map, 2024

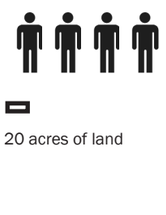
According to the author's field investigations, most farmers currently choose to migrate to cities for off-farm employment, leaving rural areas behind. Those who remain typically lease and cultivate the land abandoned by departing farmers, resulting in severe rural hollowing-out.

Income from agricultural activities

Family farm operation



Smallholder economy under the household contract responsibility system



Net Agricultural Income：120000 yuan
Per capita income：30800

source: sohu.com 做家庭农场多少亩合适？收益多少？一次讲清楚 2023-02-07
China's per capita income in 2024：95749yuan
soure:(China) National Bureau of Statistics

Montgomery (2024) examined how intensive agriculture and the development of regenerative farming can reverse soil degradation by enhancing soil health, particularly through intensive rotational grazing and agroforestry systems. Besides, there are other effective approaches for soil conservation, including conservation tillage (no-till with straw mulching), crop rotation, and smart irrigation systems, all of which contribute to the intensification of land management practices.

China's traditional land management model was characterized by small-scale peasant economy, with the household contract responsibility system implemented in 1978. Under this system, an average rural household in Suihua (e.g., 4 members) typically held approximately 20 mu (≈1.33 hectares) of arable land with independent cultivation rights.

The current land management system in China maintains household contracting as its foundation while adopting a dual-layer operation system that combines unified and decentralized management. The government encourages land transfer operations, permitting the circulation of contracted land management rights to develop appropriately scaled operations. Six models have been proposed, including "household contracting with enterprise operation" and "household contracting with family farm operation." In these cases, land ownership remains with farmers while cultivation rights are consolidated for intensive management by enterprises or family farms.

Leading agricultural enterprises typically manage an average of 794 mu (≈53 hectares) of land. Family farms achieve optimal economic returns when operating at scales of 100-200 mu (6.7-13.3 hectares). According to the "Heilongjiang Provincial Family Farm Catalogue Management Measures (Trial)", in Heilongjiang Province, crop-growing operations covering 50 mu (≈3.3 hectares) or more can be registered as family farms, while provincial-level model family farms must operate at least 150 mu (≈10 hectares) (Heilongjiang Provincial Department of Agriculture and Rural Affairs, June 1, 2020).

Based on the author's field investigations and social media surveys (@zhihu.com), farmers in Northeast China need to lease and cultivate at least 200 mu (≈13.3 hectares) to generate equivalent income for basic family subsistence through intensive cultivation. Additionally, during non-farming seasons, they often engage in other occupations (e.g., service sector jobs) to supplement household income.

1.5 POLICY BACKGROUND

1.5.6 Mechanisms and challenges in the operation of the new agricultural industrial structure

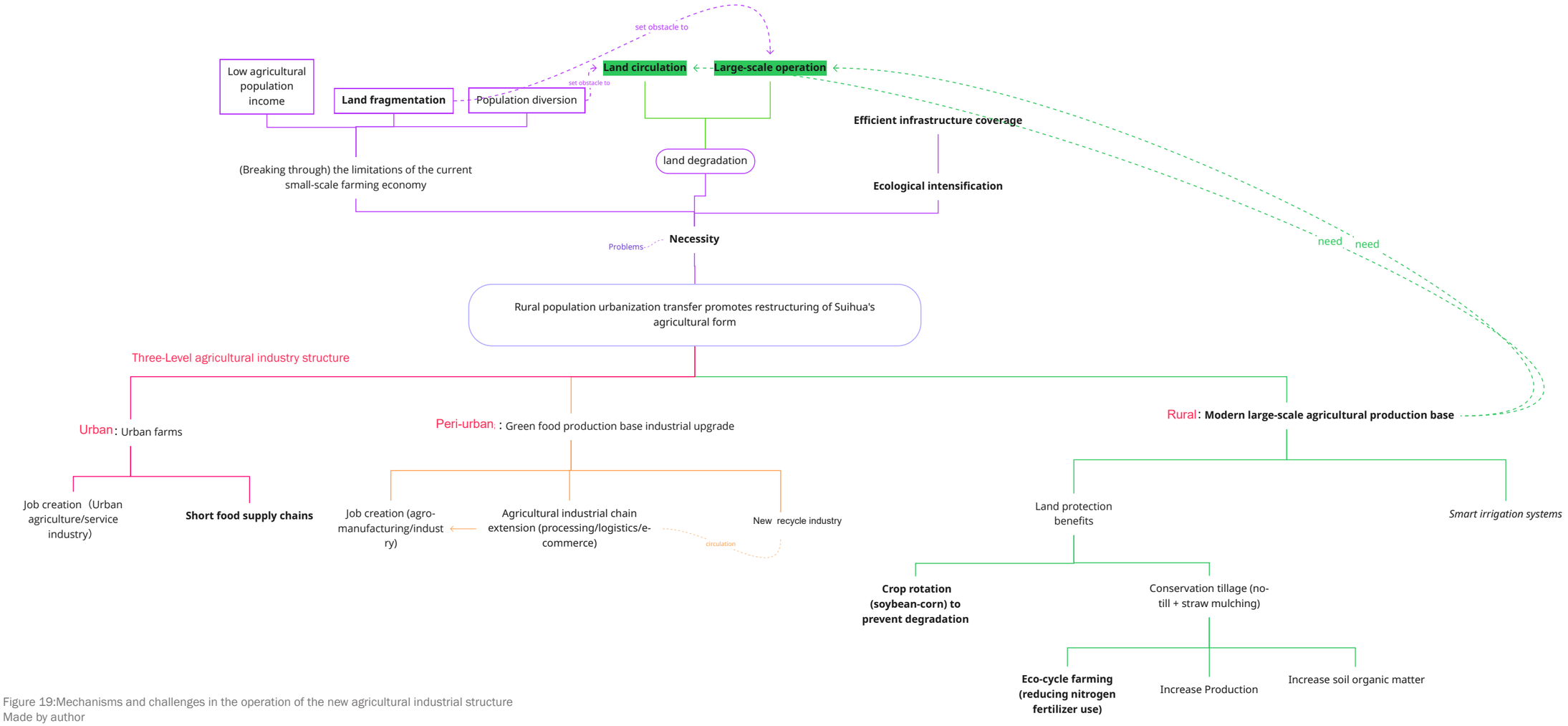


Figure 19:Mechanisms and challenges in the operation of the new agricultural industrial structure
Made by author

The approach requires rural-urban coordinated development, improving urban spatial structures while simultaneously advancing rural reforms. Suihua's shrinkage governance demands collaboration between both aspects, though this plan focuses primarily on spatial interventions within urban areas.

While rural-specific planning is not extensively designed here, rural regions remain a critical contextual factor. The two must develop synergistically—urban renewal and rural transformation should progress in tandem to ensure balanced regional development.

02 PROBLEM FOCUS

2.1 Urban Shrinkage Field

2.1.1 The Logic of the Vicious Cycle of Urban Shrinkage

2.1.2 Decaying and Redundant Space Problem

2.1.3 Inadequate Public Service Facilities

2.1.4 Social Segregation

2.1.5 Economic Problem-Land finance

2.2 Problem Statement

2.3 Research Aim

Figure 19: Decaying Northeastern City - Ichun
Source: interaction.sixthtone.com

2.1 URBAN SHRINKAGE FIELD

2.1.1 The Logic of the Vicious Cycle of Urban Shrinkage

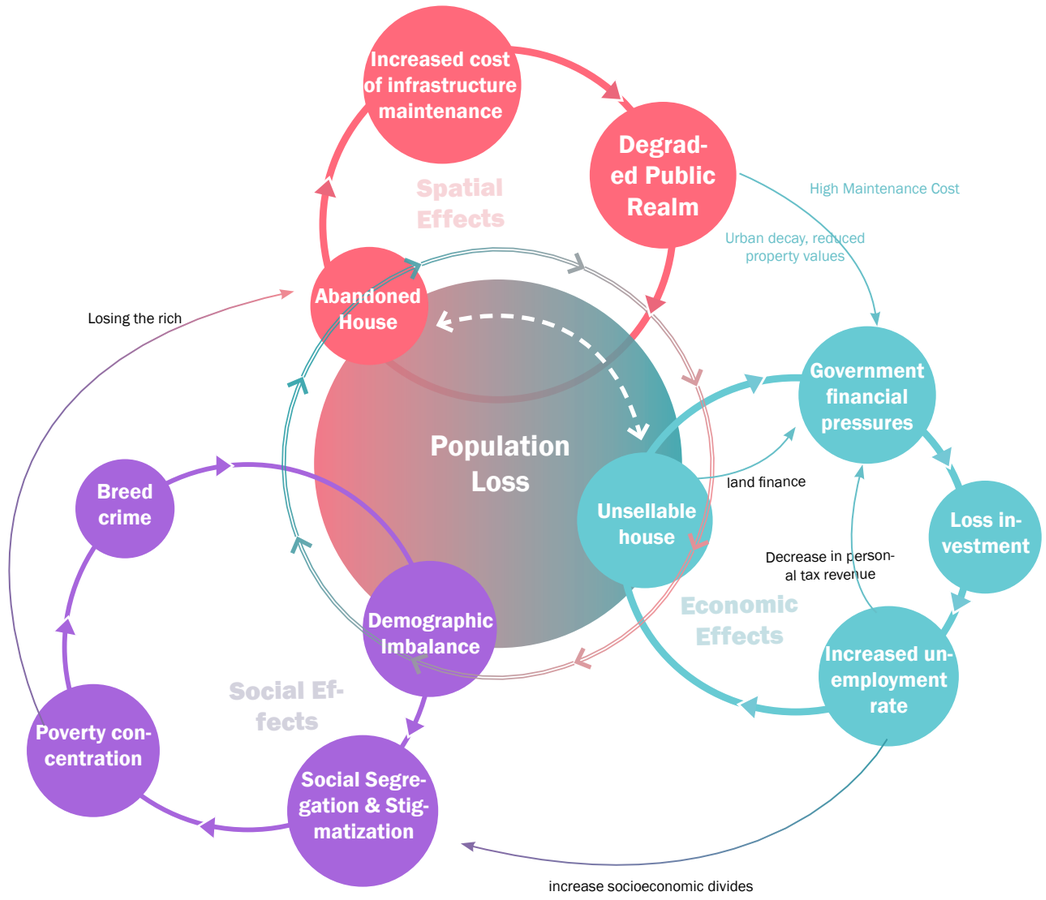


Figure 20: The Logic of the Vicious Cycle of Urban Shrinkages
Made by author

Urban shrinkage is a multifaceted process characterized by the outmigration of human capital, business closures, and investment withdrawal, driven by the interdependence of socio-economic and spatial factors, with population decline as its most visible indicator (Sun & W, 2022; Rieniets, 2009). This process triggers a series of adverse effects in urban environments. As Rieniets (2009) highlighted, common consequences include population aging, underutilization of infrastructure, housing abandonment, intensified social segregation, rising unemployment, reduced investment, and fiscal deficits.

The challenge of declining infrastructure utilization and rising maintenance costs is particularly severe in Suihua, where harsh winters require significant heating resources, making urban operations increasingly unsustainable. As public services deteriorate and economic activity declines, shrinking cities face compounded socio-economic challenges that further fuel the cycle of urban decline.

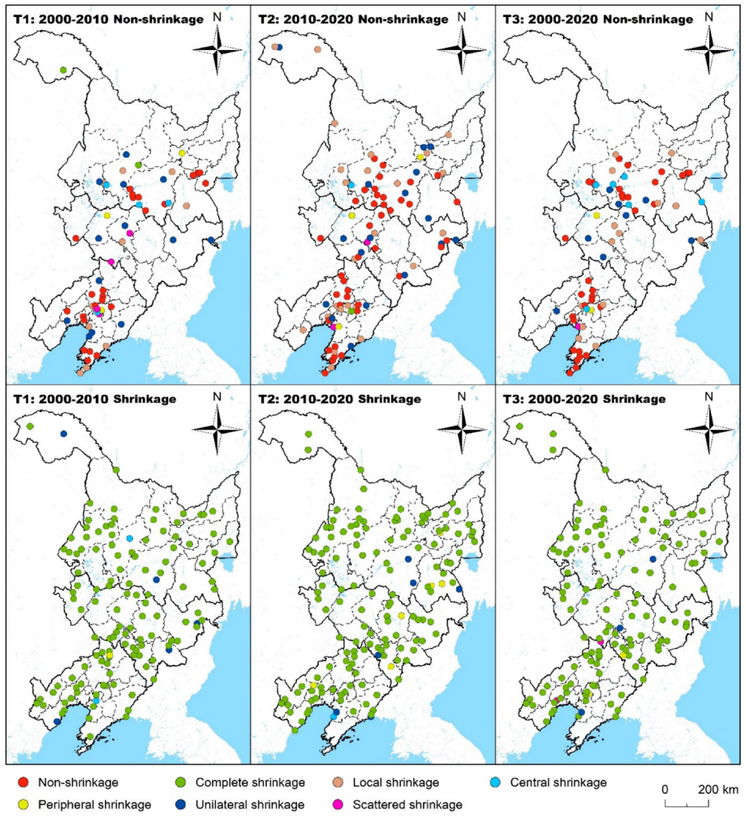
The weakening of housing demand due to population outflow leaves newly constructed housing stock unsold, causing local governments to face severe land-based fiscal crises (Zhao & Xia, 2023). Mounting fiscal pressures hinder essential infrastructure maintenance, resulting in aging urban systems and deteriorating public services(Augis, 2022). This decline in service provision further erodes the city's attractiveness, perpetuating the cycle of depopulation and urban decline.

Economically, the closure of local businesses and rising unemployment create a downward spiral of economic instability, discouraging external investment and reducing municipal tax revenues. This exacerbates fiscal constraints, weakening the local government’s capacity for public service delivery and infrastructure development.

Socially, shrinking cities face increased risks of social isolation and heightened segregation. Populations unable to migrate often experience stigmatization and diminished social cohesion. The contraction of employment opportunities concentrates poverty, intensifies socio-economic disparities, and reinforces wealth inequality within urban boundaries. In severe cases, declining urban environments may become hotspots for social unrest and criminal activity (Mykhnenko et al,2021).

2.1 URBAN SHRINKAGE FIELD

2.1.2 Decaying and Redundant Space Problem



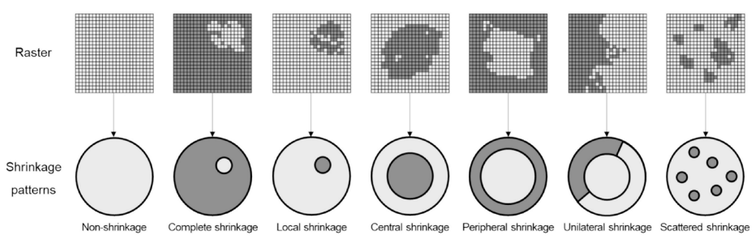
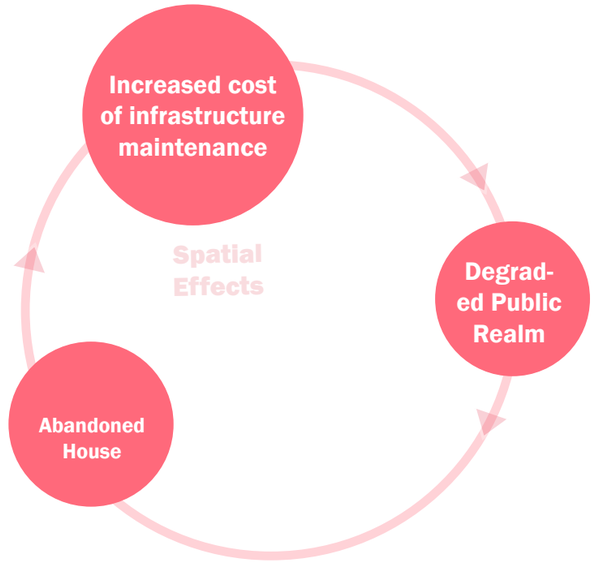


Figure 21: Spacial Patterns of City Shrinkages, (Chen et al, 2024)

Figure 22: Maintenance of aged infrastructure
Source: Suiling Government

Figure 23: Abandoned government office buildings
Source: Baidu Streetmap(2015)

Figure 24: Vacant Ground-Floor Commercial Spaces
Source: Baidu Streetmap(2015)



Some scholars have specifically studied the spatial shrinkage patterns of natural cities in Northeast China and found that Suihua belongs to the category of COM-PLETE SHRINKAGE(Figure 2.2),which means the majority of the areas within the natural city experienced popula-tion loss (chen et al,2024).

Population decline in Suihua is widespread, resulting in dispersed residential patterns, high vacancy rates, underutilized infrastructure, and elevated maintenance costs. Apart from newly constructed developments in the western part of the city, much of Suihua's existing infra-structure suffers from aging and deterioration. These aging facilities are significantly underutilized, as they primarily serve vacant homes, leading to inefficient re-source usage and adverse environmental impacts. This issue is exacerbated by the city’s reliance on centralized heating during the winter, further intensifying the envi-ronmental challenges associated with maintaining un-derused infrastructure.

2.1 URBAN SHRINKAGE FEILD

2.1.4 Economic Problem-Land finance

Figure 25 : Empty New Neighbourhood
Source: Google satellite map(2024), ltn.com.tw @peng bo

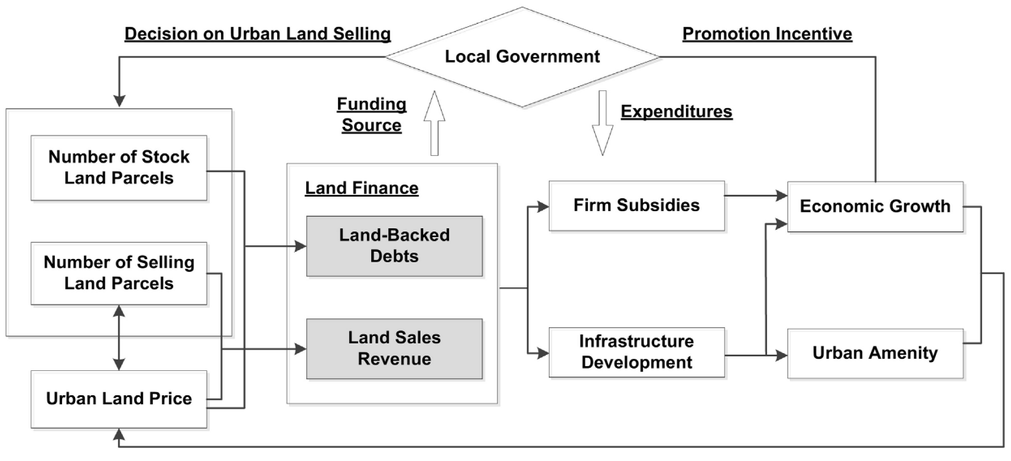
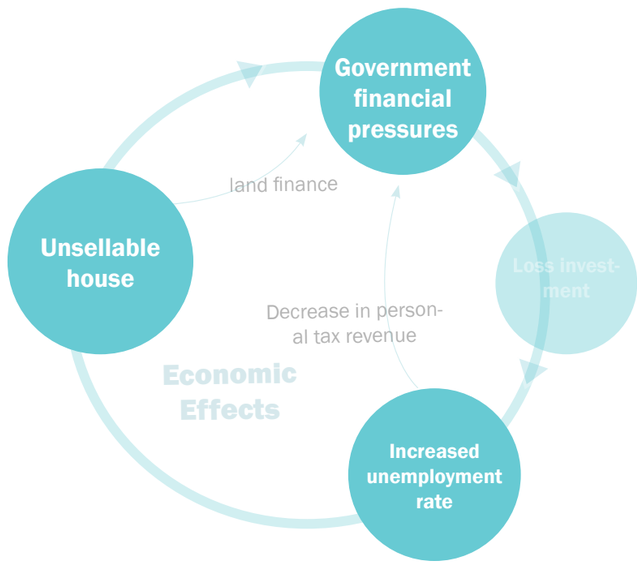


Figure 26: The logic of land finance operations
Source: Gyourko, J., Shen, Y., Wu, J., & Zhang, R. (2022)



The western part of Suihua features a dense concentration of newly constructed residential buildings, most of which were completed after 2010, with the earliest developments finalized post-2020. However, these properties remain largely unsold.

To contextualize this issue, it is essential to understand China's land finance system, as illustrated in (Figure 2.10). In brief, local governments generate revenue by selling land to property developers. This process often drives up the value of adjacent land, which can then be used as collateral to secure additional loans from banks. However, with the property market now in a significant downturn, these newly developed neighborhoods lack vitality, preventing the surrounding land from appreciating in value. Consequently, land values remain low, and this once-reliable revenue stream has significantly diminished, leaving local governments without their primary source of funding.

2.1 URBAN SHRINKAGE FEILD

2.1.5 Social Segregation Problem

Figure 27: Aged Neighborhood
Source: Baidu Street Map, 2015

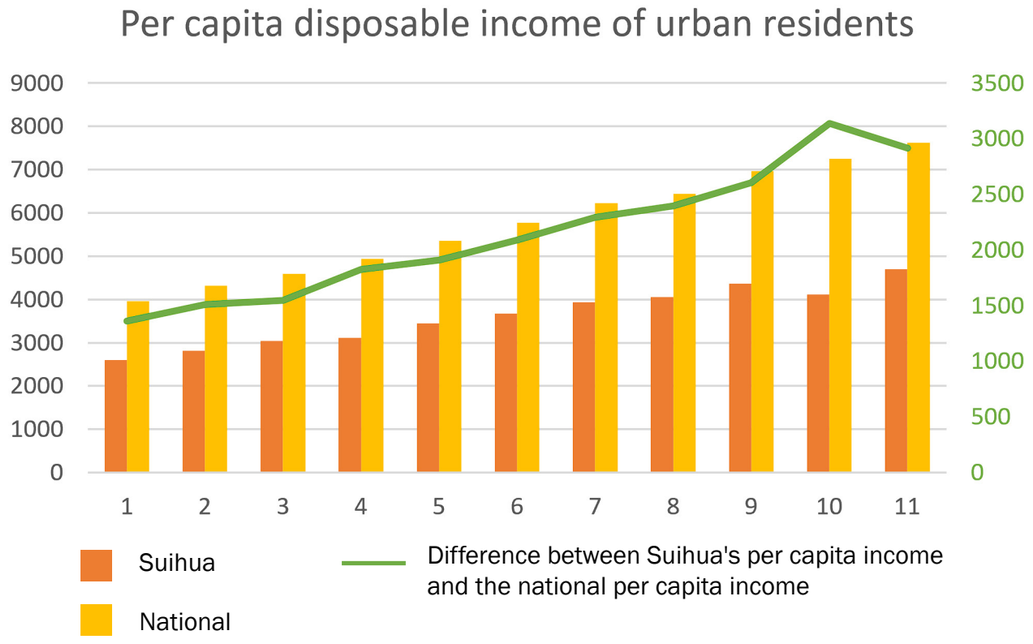
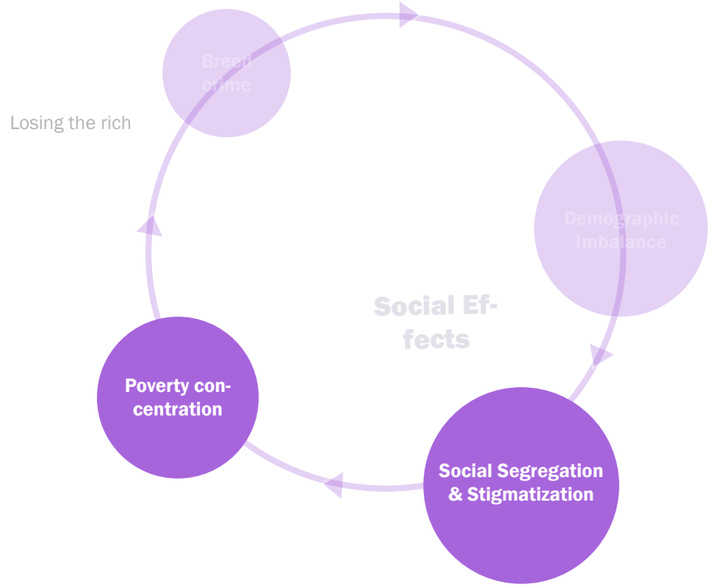
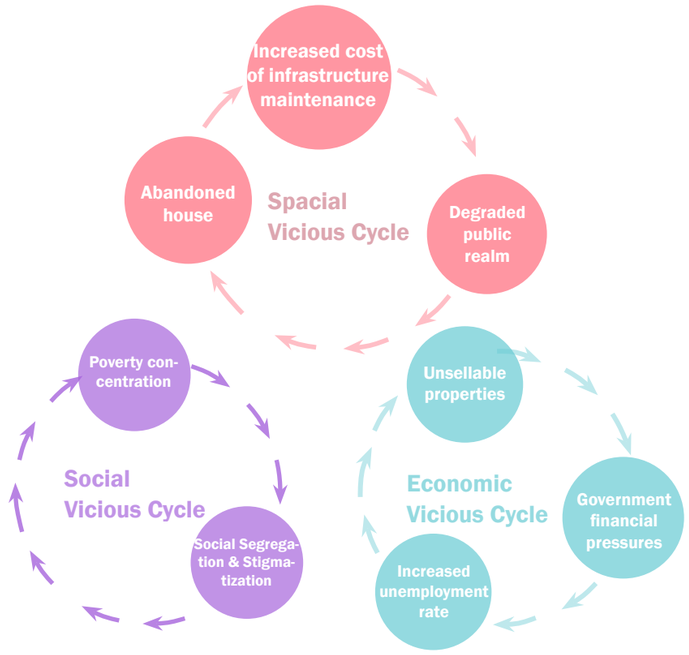


Figure 28: Aged Neighborhood
Data based on: National Bureau of Statistics



The chart(Figure 2.12) shows the per capita income of Suihua City compared to the national per capita income, and it can be seen that the gap between the two is getting wider and wider, reflecting the fact that the rich are continuing to move out of the city while the poor can't afford to stay here intelligently, and in the long run, social segregation, concentration of poverty is formed.

2.2 PROBLEM STATEMENT



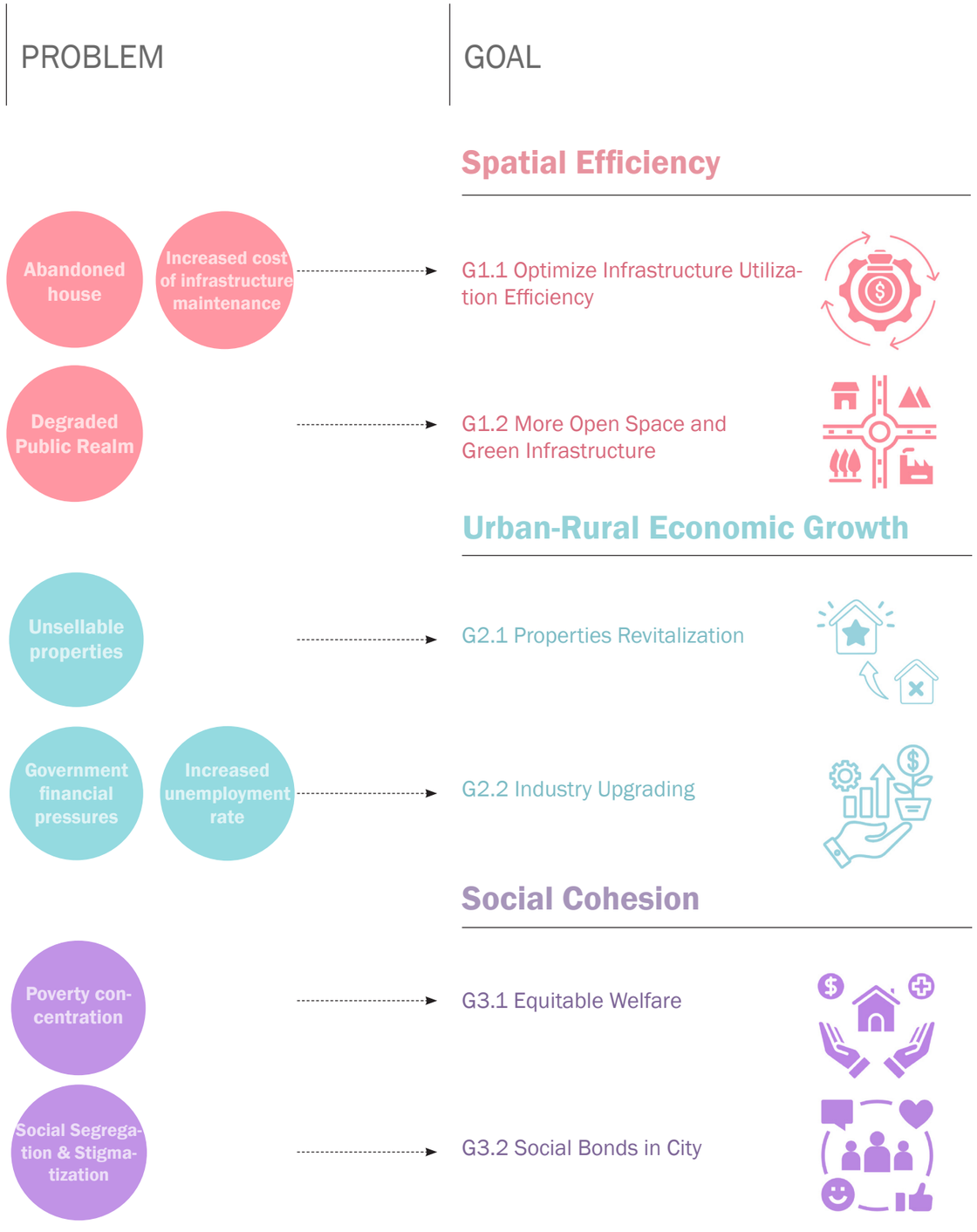
These highlighted dots represent critical intervention points within urban planning, aiming to break the vicious cycle of urban shrinkage across social, economic, and spatial dimensions. When applied to specific spaces, these spatial issues can be addressed through targeted planning strategies, indirectly influencing other interconnected problems. The ultimate goal is to mitigate the severe social challenges often associated with uncontrolled urban contraction.

Thus, these highlighted areas are the spatial manifestations of urban shrinkage, representing the specific regions I aim to focus on in my planning. By identifying and addressing these problem areas, it becomes possible to influence other related issues, ultimately disrupting the vicious cycle of urban decline.

From interviews, I sensed that the majority of Suihua City's residents are quite fond of the environment in the western new district and aspire to relocate there. They yearn to enjoy the well-established infrastructure, including tidy streets, green infrastructure, and public activity spaces such as squares. However, the cost of housing in the west is steep. Residents living in the city center are also vexed by the dilapidated surroundings and have voiced their dissatisfaction with the lack of public activity spaces.

By aligning these findings with the dots in the problem statement, I have formulated targeted goals to address the problem.

PROBLEM FOCUS



2.3 RESEARCH AIM

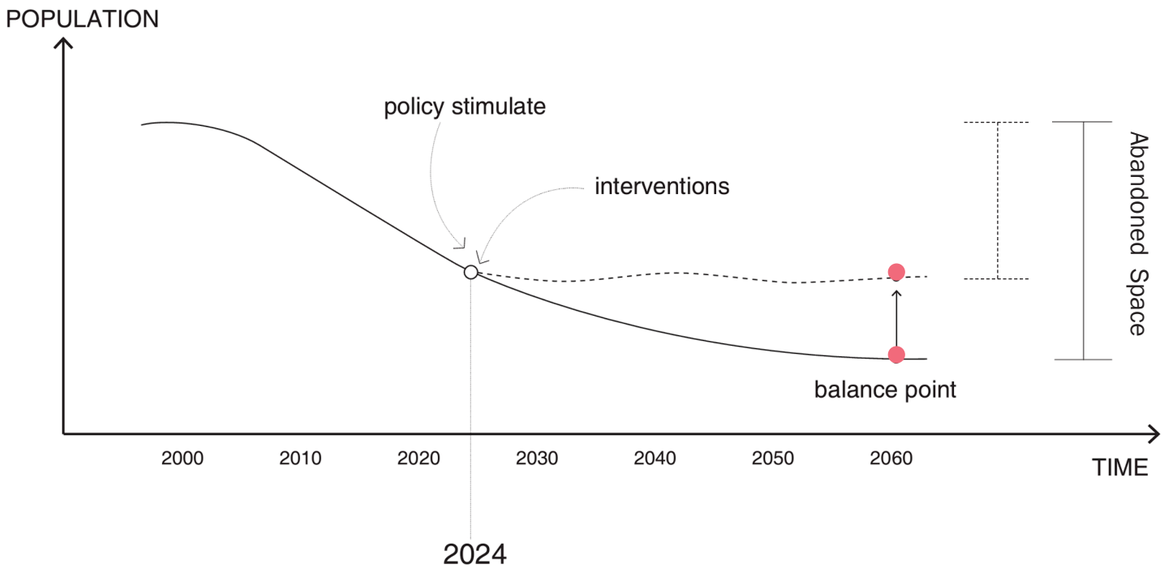


Figure 29
Data based on: (Suihua City Bureau of Statistics，2020), (Gan, 2018)

The aim of this thesis is to advance the understanding of urban planning and development within the context of shrinking cities, with a specific focus on exploring opportunities arising from urban shrinkage in Suihua, Heilongjiang Province one of the regions in Heilongjiang Province experiencing the most significant population loss. The objective is not to reverse shrinkage but to find ways **to adapt to and leverage this process for sustainable development**. As more cities face population decline in the coming decades, it is essential to study how shrinking cities like Suihua can make the most of this transformation. The study seeks to analyse the context of Suihua's shrinkage, uncovering key principles and strategies for spatial planning in shrinking regions. It will emphasize creating synergies between the challenges posed by shrinkage and opportunities for innovative land use, strengthening resilience from social, cultural, and ecological perspectives to exploring how to reimagine urban spaces for long-term sustainability.(Sun, 2024)

The ultimate goal is to leverage urban planning interventions and policy collaboration to mitigate the total population outflow in Suihua before it reaches to a population inertia of zero. This involves slowing the pace of population loss to avoid severe negative social consequences (see figure), such as increased crime rates. Additionally, the research aims to propose strategies for the rational planning of urban spaces affected by demographic gaps, ensuring that changes in spatial needs are managed sustainably and effectively.

Additionally, the research will provide actionable **recommendations for local authorities**, focusing on integrating **adaptive planning principles into existing frameworks** to inform urban planning practices in Suihua while uncovering transferable insights for other shrinking cities.

S

03 Theories and Analysis

3.1 Theoretical Analysis Framework

3.1.1 Smart shrinking

3.1.2 Compact City

3.1.3 Public Service Equalization(PSE)

3.2 Research Question

3.3 From Theories to Conceptual Framework

3.4 Sustainable Evaluation Criteria

3.5 Relevance

3.1 THEORETICAL ANALYSIS FRAMEWORK

3.1.1 Smart Shrinkage

Overview of the Concept of Smart Shrinkage

Population decline and urban shrinkage first emerged in industrial cities of developed countries in Europe and North America. In response to this phenomenon, foreign scholars, represented by Popper (2002), first proposed the concept of "Smart Shrinkage," emphasizing "less planning"—fewer people, fewer buildings, and reduced land use. As an urban planning strategy, Smart Shrinkage advocates proactively managing and adapting to urban population decline and economic recession when shrinkage becomes irreversible. Its core idea is to enhance urban sustainability and residents' quality of life by reorganizing land use, optimizing infrastructure, and promoting economic recovery, rather than blindly pursuing urban expansion.

A representative example is the Youngstown 2010 Citywide Plan in Youngstown, USA, considered the first comprehensive plan to adopt the Smart Shrinkage model. By reducing vacant land and enhancing community services, the plan optimized the city's functional layout, improved economic vitality to some extent, and slowed down population decline (Rhodes & Russo, 2013; Ryan & Gao, 2019; World Population Review/ Youngstown). Additionally, Leipzig, Germany, is a typical post-industrial shrinking city. It adopted strategies such as creative industry incubation and cultural transformation of old industrial areas. Through cultural and artistic industries leading its economic revival, Leipzig is regarded as a successful example of Smart Shrinkage (Bontje, 2004; Mykhnenko et al., 2021).

Chinese scholars, including Sun Pingjun and others, have proposed strategies for intelligent shrinkage and sustainable development in Northeast China (Sun & Wang, 2022; Dongfeng & Chengzhi, 2013).

Challenges and Limitations of Smart Shrinkage

During the implementation of the Youngstown 2010 Citywide Plan, the city of Youngstown allocated significant resources to economic development projects in the downtown area, while neglecting infrastructure improvements and public service provision in impoverished communities. This resulted in an imbalance between economic and social development (Rhodes & Russo, 2013).

Hollander and Németh (2011) summarized the limitations of Smart Shrinkage into three key points:

1.Top-down Planning: Many cities adopt government-led decision-making models, ignoring public input.
2.Neglect of Historical and Cultural Context: The planning process often assumes land as a “blank slate,” disregarding the history and cultural heritage of communities. Residents may resist relocation or community transformation, while distrust in government policies can further hinder policy implementation.
3.Difficulty in Coordinating Interests
Smart Shrinkage involves coordinating multiple stakeholders, including governments, developers, and residents, leading to complex decision-making processes.

Strategies and Practices of Smart Shrinkage

Economic and Employment Reconstruction
Smart shrinkage emphasizes economic diversification and the creation of employment opportunities. For example, several cities in Europe have achieved economic restructuring through the development of creative industries, tourism, and technology services.

Land Use and Infrastructure Optimization
Replanning land use: Transform abandoned land into urban agriculture, green spaces, or cultural and creative parks.
Infrastructure optimization: Reduce unnecessary infrastructure and concentrate resources on potential communities to avoid wasteful allocation.

Social and Community Development
Enhancing community cohesion: Increase social trust and life satisfaction among residents through community participation and decision-making transparency.
Promoting social equity: Reduce unequal resource distribution and the marginalization of impoverished areas, ensuring access to essential public services.

Environmental and Ecological Protection
Restore urban ecology by constructing green spaces and implementing environmental management measures to reduce pollution and flood risks, improving urban environmental quality.

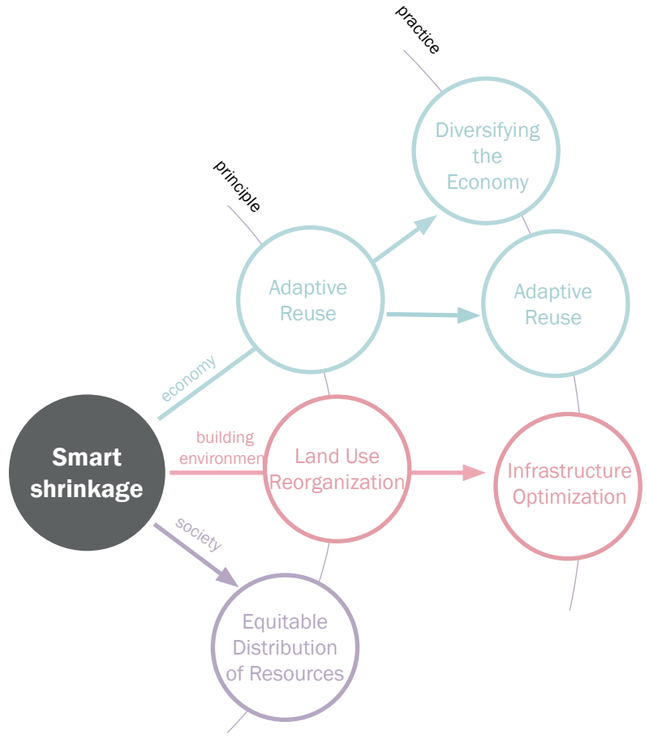


Figure 30:Theoretical Analysis Framework of Smart Shrinkage
Adapted from Rhodes & Russo (2013)

3.1 THEORITICAL ANALYSIS FRAMEWORK

3.1.2 Compact City

The Significance of the Compact City

The compact city is a sustainable urban model designed to address challenges such as urban sprawl, inefficient resource use, and population decline. By emphasizing high-density, mixed-use development, green space and sustainable transportation systems, compact cities optimize land use and improve accessibility to services and amenities. For cities like Suihua, this model provides a framework to repurpose underutilized spaces, enhance liveability, and align urban planning with smart shrinkage goals (Jenks et al., 1996).

Core Elements of Compact Cities

Compact cities are characterized by several core elements that contribute to their functionality and sustainability. High-density development concentrates populations in urban cores, reducing land consumption while supporting local businesses and services by providing a stable customer base. Mixed land use integrates residential, commercial, and cultural functions, creating vibrant, multifunctional communities that reduce commuting needs. Sustainable transportation systems, such as public transit and cycling infrastructure, further support this model by decreasing traffic congestion and carbon emissions. Additionally, compact cities prioritize the transformation of vacant spaces into public parks, plazas, and cultural hubs, fostering social interaction and improving quality of life. Green and resilient infrastructure, including renewable energy systems and urban forests, ensures long-term environmental and economic sustainability. These core elements collectively enable cities like Suihua to optimize urban planning and achieve sustainable development goals. (Simon et al 2020)

Considerations and Challenges

Overcrowding and congestion are potential risks if high-density development is not accompanied by adequate infrastructure and green spaces to maintain livability. Equitable resource distribution is another critical concern(Dempsey & Jenks, 2010). Additionally, participatory governance is essential for aligning urban planning goals with residents' needs and expectations. Transparent and inclusive decision-making processes can help build public trust and ensure the success of compact city projects (Simon et al., 2020). In conclusion, for Suihua, balancing urban density with sustainability and fostering social equity are vital for achieving the compact city model's full potential while addressing local challenges.

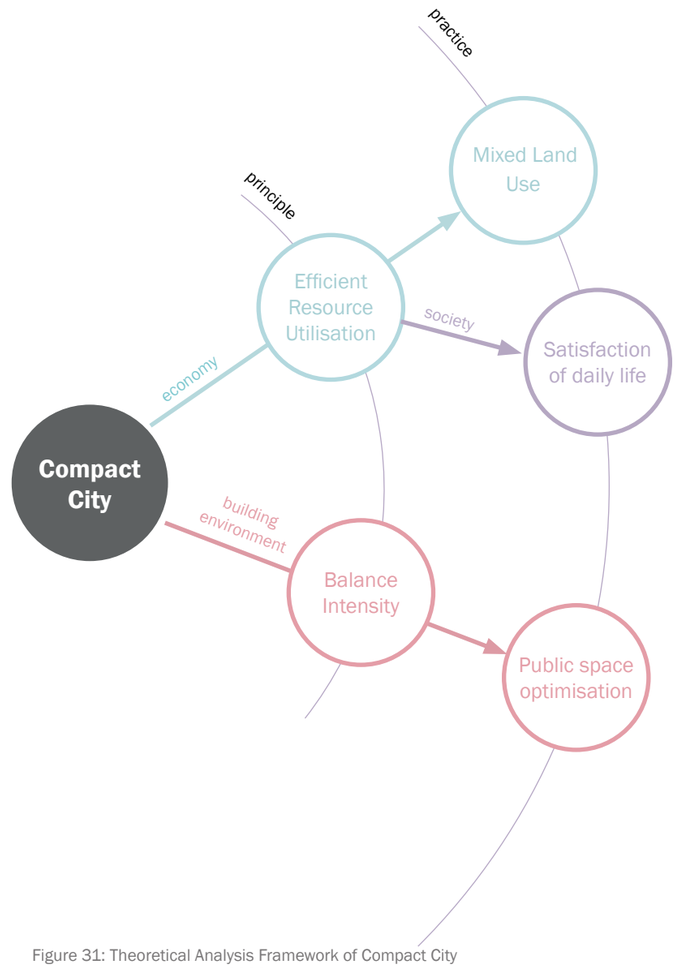


Figure 31: Theoretical Analysis Framework of Compact City
Adapted from Simon et al (2020)

3.1 THEORITICAL ANALYSIS FRAMEWORK

3.1.3 Public Service Equalization(PSE)

The Practical Significance of PSE

Public Service Equalization (PSE) aims to redistribute resources so that underdeveloped regions can access sufficient resources to provide essential services, thereby reducing disparities between regions and social groups while enhancing social equity and economic efficiency (Anand & Ravallion, 1993; Shah, 2012). PSE is a vital strategy for addressing regional disparities, ensuring that individuals from diverse socio-economic backgrounds have equal access to fundamental services such as education, healthcare, and infrastructure. Grounded in the principles of fairness and efficiency, PSE strives to balance fiscal and service inequalities across regions, emphasizing the need for equal opportunities to achieve well-being (Sen, 1999).

Mechanisms of PSE

Li et al. (2017) and Sylvie (2001) have demonstrated that public service equalization is an effective approach to reducing regional disparities within China. Both operational and non-operational public services have been shown to increase residents' income and consumption levels to varying degrees. Turnovsky (2015) explored the intricate relationship between economic growth and inequality, emphasizing the dual impact of public investment as a key driver of economic growth. While public investment can reduce inequality by enhancing labor productivity and improving infrastructure, it may also exacerbate inequality due to biases in resource allocation. Disparities in individual wealth endowments determine uneven returns on capital, leading to imbalances in the benefits derived from public investments.

To maximize the positive impacts of public investment and mitigate its potential to exacerbate inequality, Turnovsky (2015) proposed the following strategies:
Targeted Public Investments: Prioritize investments that directly improve the welfare of low-income groups, such as basic education, public health, affordable housing, and grassroots infrastructure. Public investments tend to reduce inequality when public capital serves as a high substitute for private capital but may increase inequality when the two are highly complementary.
Balanced Regional Development: Direct more investments to underdeveloped regions to reduce regional disparities and strengthen the economic capacities of disadvantaged areas.
Strengthened Oversight and Evaluation: Establish transparent evaluation systems for public investment to ensure fair resource distribution and achieve long-term balanced development goals.

Practices in PSE

Public Participation: Engage residents in the decision-making process to ensure that social security programs effectively meet local needs.
Need-Based Resource Allocation: Data-driven analyses can identify areas with the greatest deficiencies in public services. For instance, mapping underserved communities in Suihua could guide targeted investments in healthcare, education, and infrastructure. This approach ensures that resources address actual needs, maximizing their impact and improving residents' access to essential services (Shah, 2012).
Enhancing Accessibility and Liveability:
Integrated Transportation Systems: Develop interconnected public transport systems to link urban and rural areas, ensuring all residents have access to healthcare, education, and employment opportunities.
Green and Public Spaces: Invest in parks, cultural centers, and community hubs to improve residents' quality of life. Such facilities enhance a city's attractiveness to both current and prospective residents.
Affordable Housing Programs: Implement housing policies that ensure all income groups have access to affordable and accessible living spaces, reducing socio-spatial inequalities.

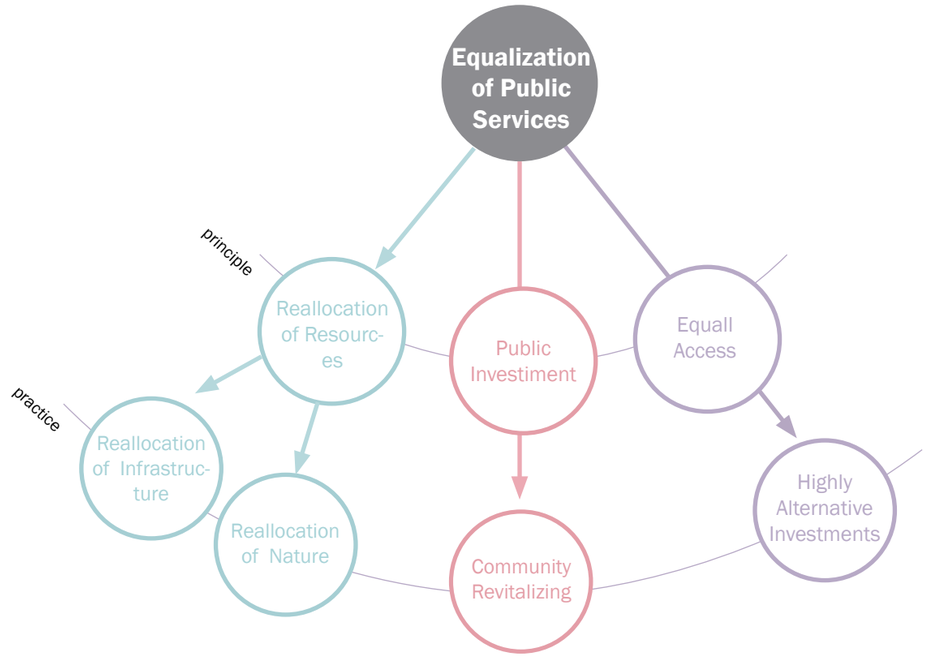


Figure 32: Theoretical Analysis Framework of PSE
Adapted from Turnovsky (2015)

3.1 THEORETICAL ANALYSIS FRAMEWORK

3.1.4 Agricultural Economy-Driven Urban-Rural Coordinated Development (AUD)

The Practical Significance of AUD

Based on the practical demands of China's agricultural transformation, the strategic positioning of Suihua City's agricultural pillar industries, and the urgency of black soil conservation, this study proposes the "Agricultural Economy-Driven Urban-Rural Coordinated Development Theory." This theory posits that through systematic optimization of land resource allocation and a structured labor transfer process, synergistic advancement of agricultural modernization and urban economic vitality can be achieved. At its core, this theory establishes a trinity development mechanism integrating land intensification, labor migration, and industrial upgrading to ensure sustainable progress.

Mechanisms of AUD

First, promoting large-scale land operation is the fundamental path to achieving agricultural modernization. Research shows that China's agricultural labor force exhibited a distinct spatial pattern of "decrease in the east and increase in the west" between 1991 and 2010 (Ma et al., 2019), creating conditions for large-scale land operation. In the economically developed eastern regions, the reduction of agricultural labor and intensive land use formed a virtuous cycle. For example, the Yangtze River Delta region achieved a remarkable 82% agricultural mechanization rate through land transfer (Ge et al., 2018b). This model proves that transforming fragmented smallholder farming into family farms or corporate operations can effectively unleash the benefits of land scale and improve agricultural productivity.

Second, the orderly transfer of rural labor to urban areas is key to stimulating economic vitality. Labor transfer generates dual dividends: on one hand, it provides human resources for urban secondary and tertiary industries, such as the 15% employment growth in logistics and retail driven by Inner Mongolia's dairy industry (Ma et al., 2019); on the other hand, through land contract rights transfer, migrant workers obtain stable property income. This arrangement of "leaving the land without losing rights" protects farmers' interests while promoting the flow of urban-rural factors. Notably, among the six coupling types identified in research, intensive regions (where agricultural economy grows while labor decreases) demonstrated the most significant development outcomes (Ma et al., 2019), providing important references for labor transfer policies.

Third, industrial integration and innovation are crucial measures to enhance agricultural value. Practices in regions like the Yangtze River Delta show that through the "agriculture + e-commerce + tourism" tri-sector integration model, the value of agricultural product processing can increase by 140% (Ma et al., 2019). Developing technological agriculture (e.g., biopharmaceuticals, precision agriculture) and extending industrial chains can multiply the value of traditional crops by 3-5 times (Zhang et al., 2018), charting the course for agricultural transformation and upgrading.

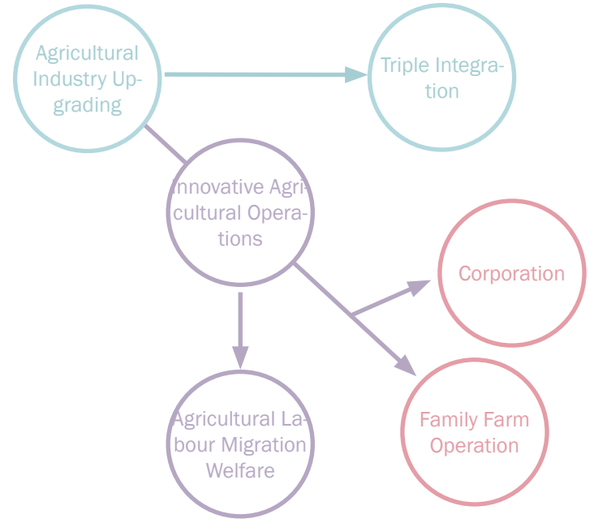


Figure 33: Theoretical Analysis Framework of Compact City
Adapted from Simon et al (2020)

Main Question: How can spatial planning apply the concept of smart shrinkage to explore the adaptive reuse of land and buildings, enhancing Suihua's resilience in the context of future population decline?

Figure 34: Land use vision of the Youngstown 2010 Citywide Plan
Author: Brent & Shuqi (2019□

3.3 CONCEPTUAL FRAMEWORK

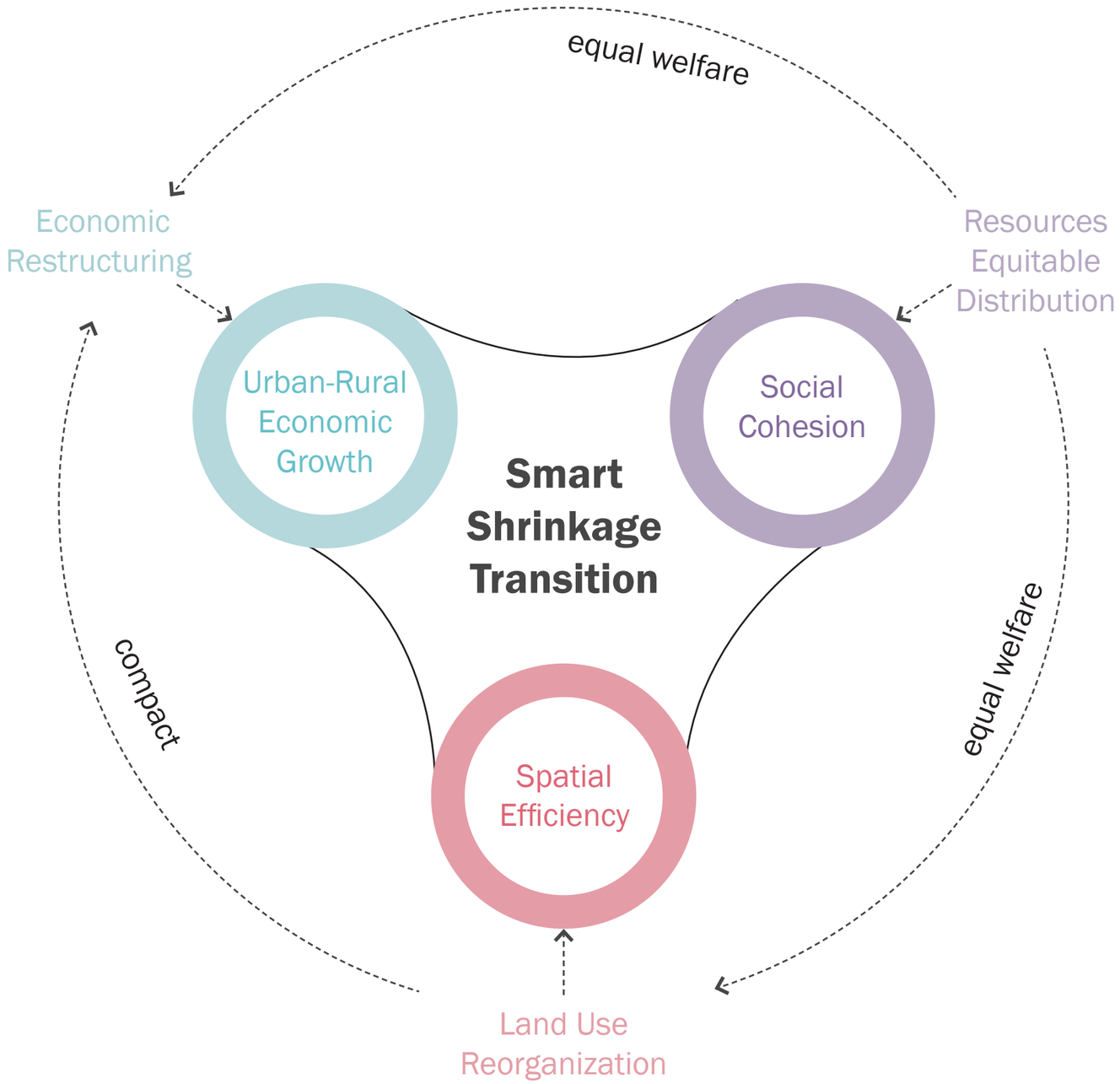


Figure 35: Conceptual Framework
Made by author

Building upon the previously established theoretical framework, this project has developed a multi-scale conceptual framework as illustrated in Figure 35. The conceptual framework centers on smart shrinkage as its core, aiming to achieve three primary objectives: Social Cohesion, Urban-Rural Economic Growth, and Spatial Efficiency. Grounded in prior theoretical analysis, the realization of these three objectives is guided by three fundamental principles: Resources Equitable Distribution, Economic Restructuring, and Land Use Reorganization.

3.4 SMART SHRINKAGE PRINCIPLE STRUCTURE

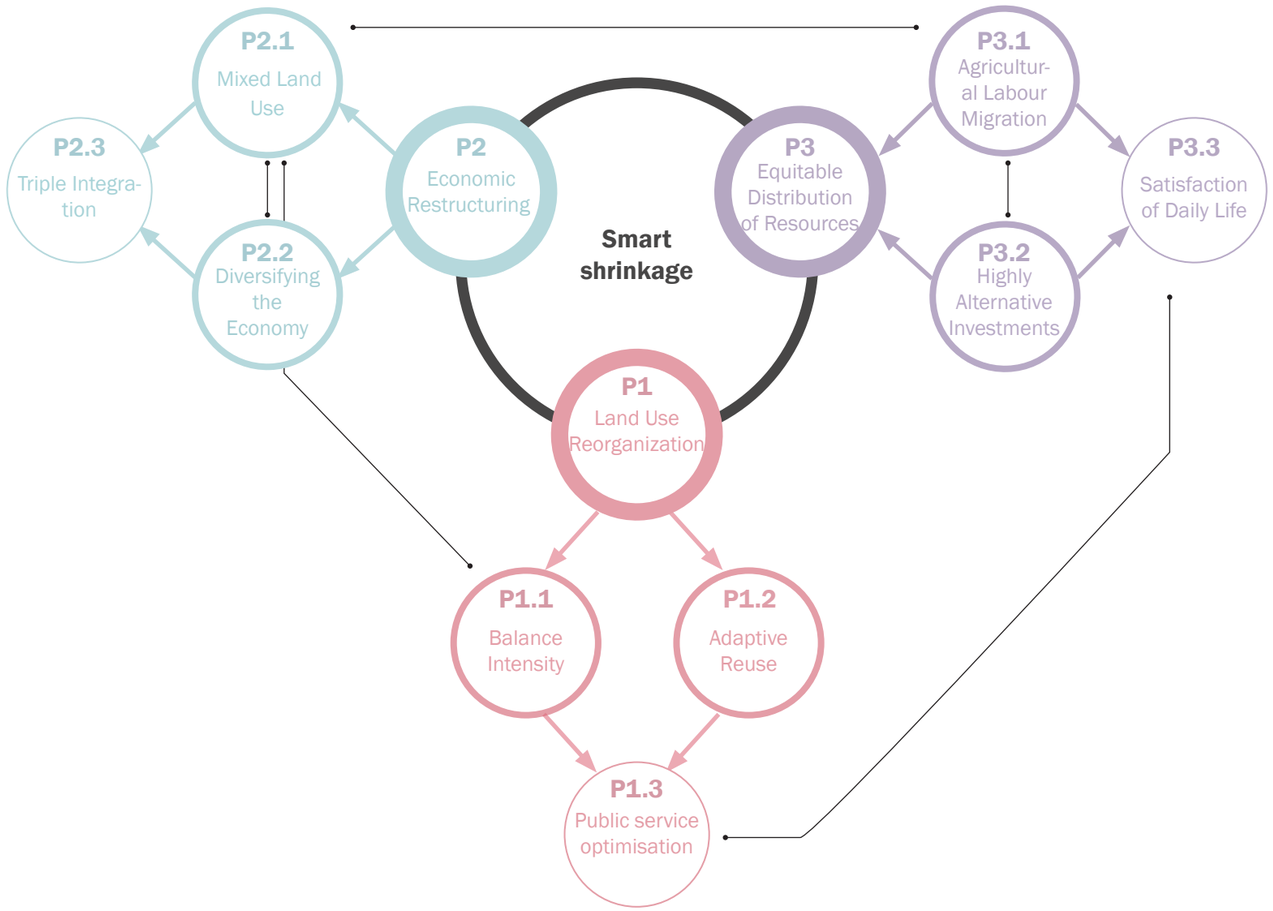


Figure 36: Principle Framework
Made by author

This study proposes a three-dimensional governance principle framework centered on "Smart Shrinkage". Through three mutually reinforcing theoretical dimensions - "Land Use Reorganization," "Economic Restructuring," and "Equitable Distribution of Resources" - the framework systematically addresses the complex challenges faced by shrinking cities.

1. "Land Use Reorganization" guides the reshaping of Suihua's **Spatial Order**. The "Balance Intensity" principle addresses the contradiction between excessive density and insufficient public spaces in urban areas, advocating strategic "green space reservation" to optimize development intensity by transforming underutilized land into ecological and service-oriented open spaces. Meanwhile, the "Adaptive Reuse" principle is applied to valuable buildings, allowing their conversion into public service facilities that meet community needs. These processes all require precise guidance and support from "Public Investment" to ensure smooth spatial restructuring aligned with overall public interests.

2. "Economic Restructuring" aims to promote urban **Economic Development** and address population loss caused by economic decline. The economic transformation follows the principles of "Diversifying the Economy" and "Mixed Land Use" to create a diversified economic market. Based on Suihua's strategic positioning as an agricultural core area, it achieves industrial upgrading for this agricultural city through the "Triple Integration" of agricultural production, processing manufacturing, and service trade. This approach not only enhances agricultural added value but also creates more employment opportunities, strengthening urban economic vitality.

3. "The Equitable Distribution of Resources" principle ensures **Social Cohesion** during the shrinkage process, with particular focus on protecting the rights and interests of Transitioning Agricultural Populations. By establishing a support system encompassing "skills training-employment matching-social security," it facilitates their smooth occupational transition. Resource allocation should adhere to the "Highly Alternative Investments" principle and optimize public service layouts according to the "Satisfaction of Daily Life" standard, such as constructing 15-minute living circles to ensure all residents, including new urban citizens, can equally enjoy urban amenities.

04 Methodology

4.1 Research Methods and outcomes

4.2 Research Flow

4.1 RESEARCH METHODS AND OUTCOMES

Sub Research Questions	Scale	Methods	Outputs
SQ1: What are the factors that have caused shrinking population and how these are likely to change with respect to the ongoing trends?	City Regional	M-2 literature review M-6 research by public media	An analysis of the essence of Suihua's shrinkage, demonstrating the necessity of planning for urban shrinkage in this city.
SQ2: What policies and spatial strategies are used or can be implemented to address urban shrinkage so that mitigate the pace of population loss?	City	M-2 literature review M-3 research by gis/mapping M-4 demographic statistics analysis	Policy guidence sturcture and conceptual framework.
SQ3: What is the extent and the social, spatial, economic (etc.) impacts of shrinkage?	City Neighbourhood	M-1 policy analysis M-2 literature review M-5 reference cases study	Finding Hot Spots, define hot (areas to be strengthened) and cold (areas to be strengthened) typologies.
SQ4: What opportunities exist while mitigate the shrinkage of suihua?	City Regional	M-3 city scale mapping M-6 research by public media M-7 field trip - photogragh and street interview	Recommendations for industrial upgrading and green industry transformation from the perspective of economic development, alongside spatial planning, to jointly contribute to the sustainable development of the city.
SQ5: How can proactive shrinkage planning create a compact and liveable environment for its future remaining residents?	City Community	M-2 literature review M-3 research by gis/mapping M-7 field trip - photograph and street interview	Macro scale： A vision map for adaptive shrinkage-oriented planning (including strategies for addressing vacant housing, revitalizing communities, and the reuse of land for building green infrastructure, etc.).
SQ6: Can we achieve the goal of proactive shrinkage through land and building reuse opportunities?	City Community	M-3 neighbourhood scale mapping M-7 field trip - photograph and street interview M-8 stakeholder analysis	Meso scale: Spatial strategies for sustainable development in the specific part of Suihua. Micro scale: neighborhood regeneration plan. (neighborhood economy, shops, community gardens, urban agriculture).

4.2 RESEARCH FLOW

M-1 Policy Analysis
M-2 Literature Review
M-3 Research by gis/mapping
M-4 Demographic Statistics Analysis
M-5 Reference Cases Study
M-6 Public media
M-7 Field trip

Motivation → Population loss,The North-East and New North-East phenomena

Problem Field → As a mid-stage shrinking city in Northeast China - Suihua faces a multifaceted problem field shaped by significant population decline, economic stagnation, and spatial imbalances.

Location Suihua → Areas that have experienced the most dramatic population loss in the last decade.

Problem Statement → Due to the rapid processes of globalization and urbanization, Suihua City is undergoing urban shrinkage, with key development elements such as population, funds, and factories moving away. The population decline, vacant housing, and the city's existing economic and ecological issues are limiting its sustainable development. Therefore, this study explores how adaptive shrinkage strategies can be employed to address these challenges while identifying sustainable development pathways for the city.

Research Aim

Research Questions → Main Question: How can spatial planning apply the concept of smart shrinkage to explore the adaptive reuse of land and buildings, enhancing Suihua's resilience in the context of future population decline?

Conceptual Framework

Analysis

SQ1 What are the factors that have caused shrinking population and how these are likely to change with respect to the ongoing trends? M-2 M-6

SQ2 What is the extent and the social, spatial, economic (etc.) impacts of shrinkage? M-2 M-3 M-4

SQ3 What policies and spatial strategies are used or can be implemented to address urban shrinkage so that mitigate the pace of population loss? M-1 M-2 M-5

Strategy

SQ4 What opportunities exist while mitigate the shrinkage of suihua? M-3 M-6 M-7

SQ5 How can proactive shrinkage planning create a compact and liveable environment for its future remaining residents? M-2 M-3 M-7

SQ6 Can we achieve the goal of proactive shrinkage through land and building reuse opportunities? M-3 M-7 M-8

Conclusion

Outcomes

- An analysis of the essence of Suihua's shrinkage, demonstrating the necessity of planning for urban shrinkage in this city. (city&region)
- Guide map of smart shrinkage. (city)
- Master plan of spatial planning. (city)
- Strategies of adaptive reuse and industrial transformation. (city&neighbourhood)
- Time plan. (city)
- Suggestion on policy making and investment. (city)

Resilient Cities after Smart Shrink Planning

05 Spatial Analysis

5.1 Spatial Pattterns

5.2 SWOT Analysis

5.3 Shrinkage Identification

5.4 Shrinkage Typologies

Figure 37: Suihua City Map(PLC)
Source: 1mpi.com

5.1 SPATIAL PATTERNS

5.1.1 Spatial Focus

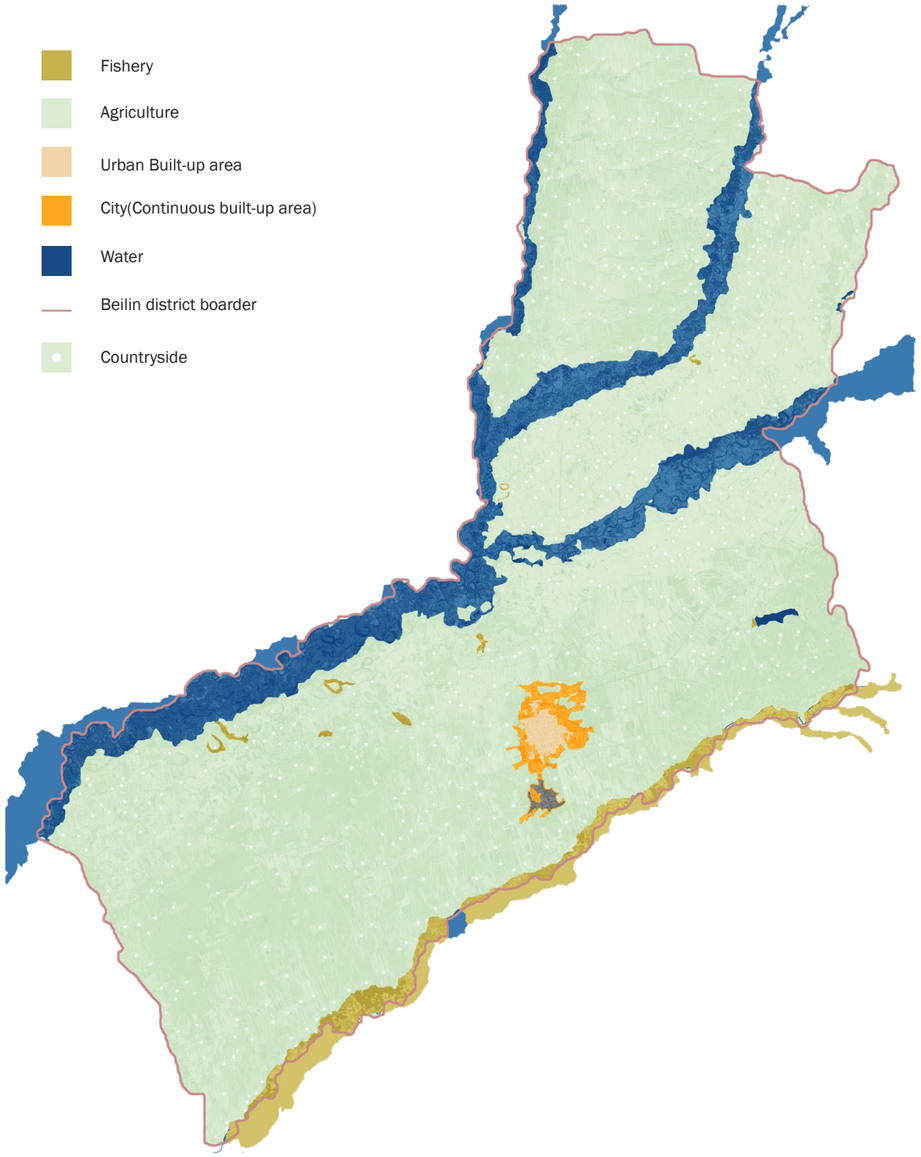


Figure 38: Case Study Area Profile
Made by author, based on Google satellite map(2024)

Beilin District covers an area of 2,756 square kilometres, with a built-up urban area of 30 square kilometres, and a total population of 698,000 people, including a rural population of 382,000(56.34%) people and an urban population of 316,000(43.66%) people. (Data from Suihua Municipal Bureau of Statistics)

Figure 39: Screen-shot of searching “handiheitu product” in Google

Heilongjiang Province has ranked first in grain production in China for 14 consecutive years. Suihua, as a major agricultural city, contributes approximately one-seventh of the province's total grain output, playing a vital role in Heilongjiang's contribution to national food security. Located in the world’s golden corn belt, golden dairy belt, and premium soybean production zone, Suihua boasts fertile farmland and comprehensive green food cultivation, earning it the title of "China’s Homeland of Cold Black Soil Specialty Products."

Beilin District, situated in central Heilongjiang Province, features flat terrain and lies at the heart of the Songnen Plain, one of the world's three major black soil regions. The district has a total cultivated area of 3.24 million mu, with over 80% comprising black soil, black calcium soil, and meadow soil. It is renowned for producing soybeans, wheat, corn, sugar beets, flax, and potatoes, serving as a key commercial grain base for both Heilongjiang Province and the nation.

In 2023, the district’s total sown crop area reached 3.146 million mu, including 1.03 million mu of rice, 1.63 million mu of corn, 458,000 mu of soybeans, and 26,000 mu of potatoes. The total grain planting area covered 185,827 hectares, yielding an output of 1,262,540 tons of grain.

5.1 SPATIAL PATTERNS

5.1.1 Spatial Focus

Suihua city, Beilin District---A small agricultural town on the edge of Northern China

Figure 40: Case Study Area Profile
Made by author, based on Google satellite map(2024)

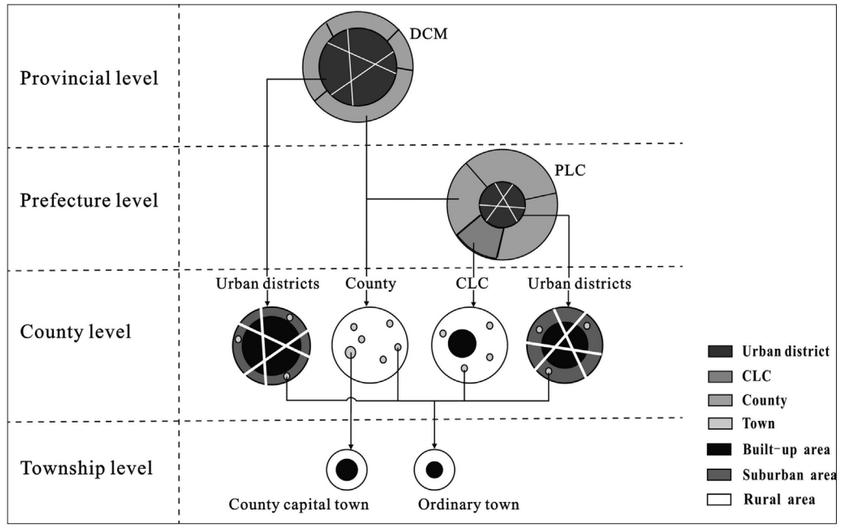


Figure 41: A multi-scalar perspective on Chinese cities: delimiting urban areas within political-administrative units of subnational authorities. Urban districts of directly controlled municipality (DCM) and prefecture? level cities (PLC) are separated by straight white lines, with an arrow pointing to a more detailed picture of these urban districts at a lower scale (country level). Similarly, ordinary towns (light grey dots at the county level) are then zoomed into (see arrows pointing downwards) at a lower scale (township level). Source:(Li & Mykhnenko, 2018)

Before we proceed, we need to define what we mean by the city in the Chinese context and to explain our methodology. This article focuses on population loss as the key indicator of urban shrinkage in China since 1990. In mainland China, this study has had to confront four different administrative types of urban settlement: (1) directly controlled municipalities (DCMs); (2) prefecture-level cities (PLCs); (3) county-level cities (CLCs); and (4) ordinary towns. None of these cities is an exclusively urban entity, but rather a political-administrative unit comprising, typically, both an urban core (roughly comparable to the continuously built-up area) and surrounding peri-urban and rural areas (see Figure 2.2)(Li & Mykhnenko, 2018).

5.1 SPATIAL PATTERNS

5.1.2 Main Spatial Elements

Figure 42: Distribution of old neighbourhoods
Made by Author

- Aging neighbourhoods in need of maintenance
- Abandoned buildings
- Railway

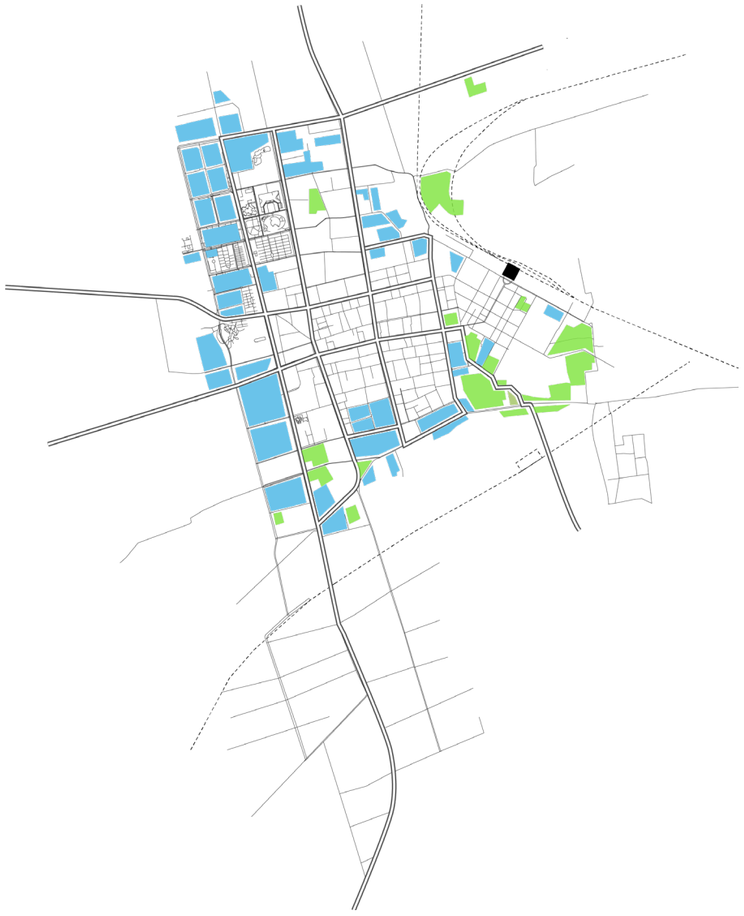


Figure 43: Distribution of new neighbourhoods
Made by Author

- Residential communities built after 2010
- Urban prairie
- Main road

Suihua entered a phase of rapid urbanization after 2010, with a large amount of countryside being demolished and a large number of **new high-density residences appearing in the western part** of the city. And after 2019 the urbanization process was significantly reduced, many planned land construction was put on hold creating an urban grassland landscape.

Since 2020, the government of Beilin District, Suihua City, has issued 70 public notices on **infrastructure renovation** of old neighbourhoods, and the scope of the renovation community is the old neighbourhoods or single residential buildings built before the end of 2005 that need to be renovated or residential buildings whose safety level has been appraised to be Csu, including a total of about 100 neighbourhoods. The renovation works include the maintenance of the buildings themselves including doors, windows, roof waterproofing, external wall insulation, etc., as well as the community's public service facilities including water pipes, electrical circuits, heating pipeline repairs, lighting renovation and street maintenance. These older communities in urgent need of renovation are concentrated in urban centers. **The funds required for the renovation are applied for 80% of the central budget investment and about 20% of the local investment**. Some of the renovation projects were temporarily put on hold in 2024 due to funding issues.

5.2 SWOT ANALYSIS

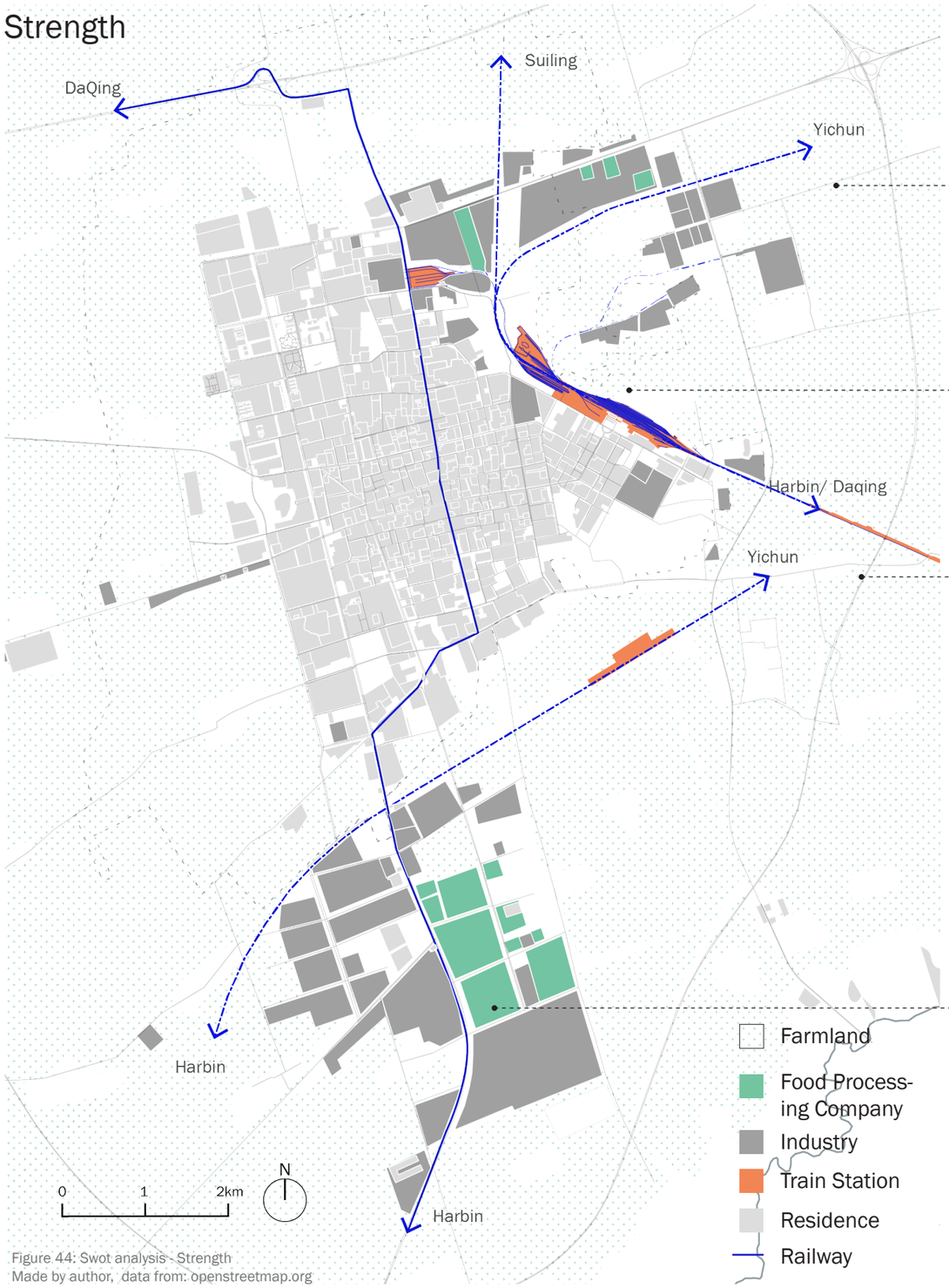


Figure 44: Swot analysis - Strength
Made by author, data from: openstreetmap.org

Figure 45: Farmland in Suihua
Source:

S1 Agricultural Resources and Grain Production Advantages

Suihua is situated in the core area of the world's rare black soil belt, featuring exceptionally fertile land ideally suited for cultivating soybeans, corn, rice and other crops with consistently high yields.

Figure 46: Freight train at Suihua Railway Station
Photographs by author

S2: Well-developed Transportation Network

Figure 47: Crisscrossing highways and high-speed rail
Source: Heilongjiang Daily News, 2022

The Harbin-Suihua Expressway, Suihua-Beian Expressway, and Binbei Railway traverse the entire region, with Suihua Railway Station serving as a key provincial rail hub. Additionally, a high-speed rail station in southern Suihua City is scheduled for completion within 2025.

Figure 48: Agricultural product processing cluster
Source: baike.baidu

S3: Industrial Development Potential

Suihua's southern agricultural product processing cluster has attracted some leading enterprises, with emerging industrial chains in corn and milk deep-processing. The city has also established preliminary industrial systems encompassing energy, petrochemicals and textiles sectors.

5.2 SWOT ANALYSIS

Weakness

Figure 49: Swot analysis - Weakness
Made by author, data from: openstreetmap.org

W1: High-density development imbalance

High-density urban development has resulted in disproportional land use allocation, allocation of industrial, residential, and green space land uses. The residential-to-green space ratio is inadequate (current green space ratio: 27.26%, significantly below the National Garden City standard of 35%).

Data Source: Ministry of Housing and Urban-Rural Development

W2: Insufficient Quality Public Services

Existing public squares are dominated by hard paving, lacking greenery and rest facilities.

Figure 50: Square in front of Suihua City Government
Photographs by author

Ineffective Green Space Distribution: Primary green spaces are concentrated in peripheral zones, with an average service distance exceeding 1,000 meters from residential areas (based on a 15-minute walk-ability assessment).

W3: Demographic Structural Challenge

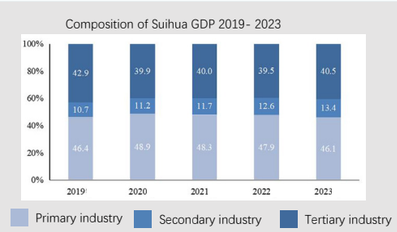
Significant out-migration, especially among young, educated residents.

Severe aging imbalance: The 60+ age group accounts for 23.7% of the population (surpassing the 10% threshold for an "aging society").The 65+ cohort reaches 15.69% (more than double the 7% international standard), confirming advanced aging.

Data Source: National Bureau of StatisticsNational Development and Reform Commission. (2016)

W4: Single industry structure

A mono-economy heavily reliant on agriculture, with limited industrial diversification and technological development.



Data Source: Suihua Statistics Bureau

5.2 SWOT ANALYSIS

Opportunity

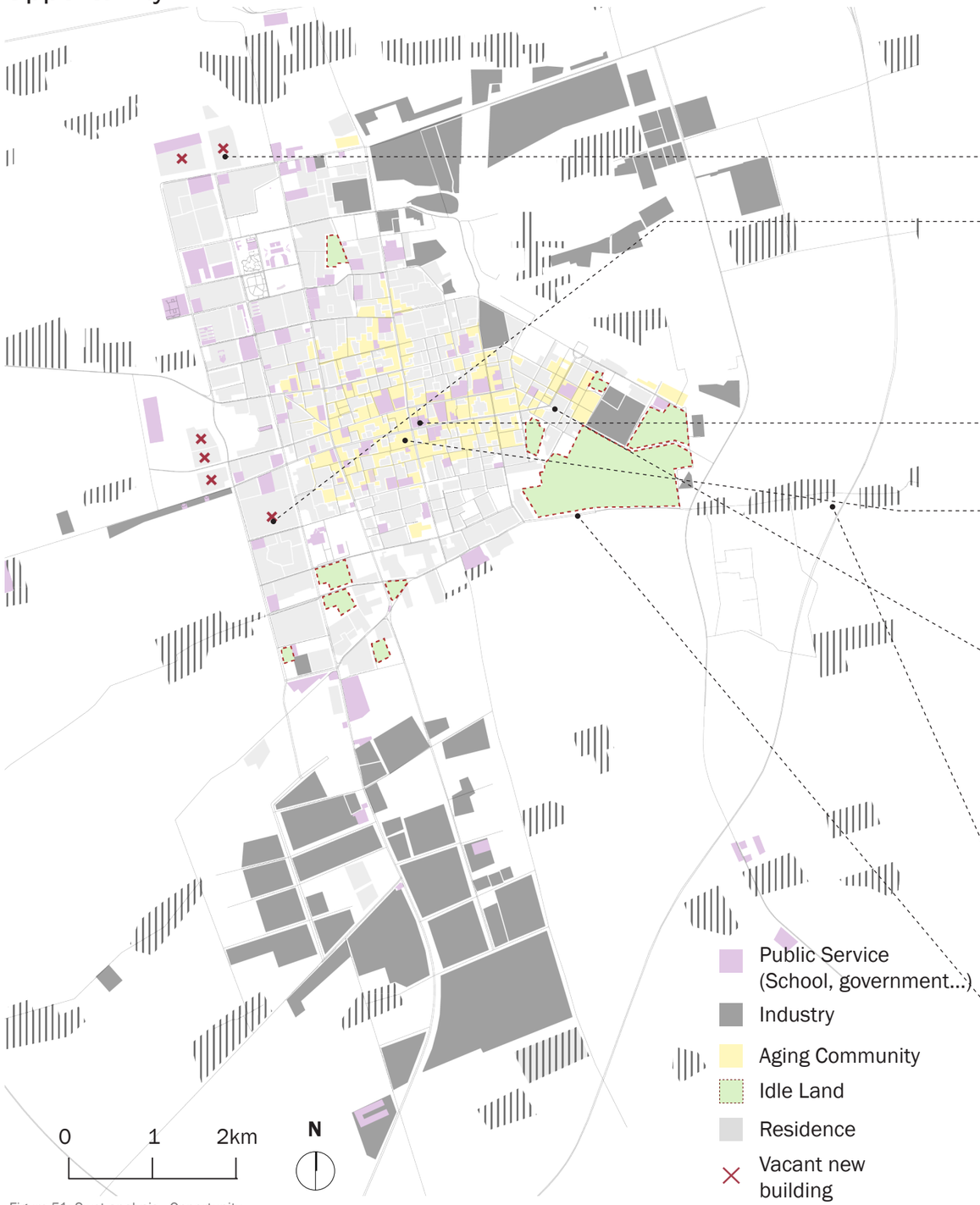
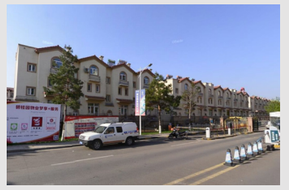


Figure 51: Swot analysis - Opportunity
Made by author, data from: openstreetmap.org

Figure 52: New Community in Suihua
Photographs by author

O1: Adaptive Reuse of Well-Preserved Vacant Properties



Well-preserved yet underutilized properties can be directly adaptively reused. By introducing innovative economic functions or converting them into affordable housing inventory, these assets can be revitalized quickly and cost-effectively without major renovations.

Figure 53: Villas
Source: Baidu Streetmap(2015)

Figure 54: Homes for sale in the city center
Photographs by author

O2: Strategic Reorganisation of Aging or Abandoned Structures

For dilapidated informal settlements or long-abandoned buildings, a two-tiered approach is recommended:

Demolition for Spatial Reconfiguration: If beyond repair, selective demolition offers a chance to rebalance urban spatial structures, freeing land for public amenities, densification, or ecological corridors to address citywide imbalances.

Figure 55: New Community in Suihua
Photographs by author

Heritage Assessment & Rehabilitation: If historical or structural value exists, targeted restoration can repurpose them into cultural venues, affordable housing, or green infrastructure.

Figure 56: New Community in Suihua
Photographs by author

O3: Rural Migrant

The ongoing rural-to-urban migration trend represents a strategic demographic opportunity for targeted urban population expansion and workforce enhancement.

Figure 57: Vacant rural villages along railroad lines
Photographs by author

O4: Idle Land

The vast vacant industrial land adjacent to the railway transportation hub presents significant potential for developing integrated primary-secondary-tertiary industries.

Figure 58: Abandoned industrial plants
Photographs by author

5.2 SWOT ANALYSIS

Threat

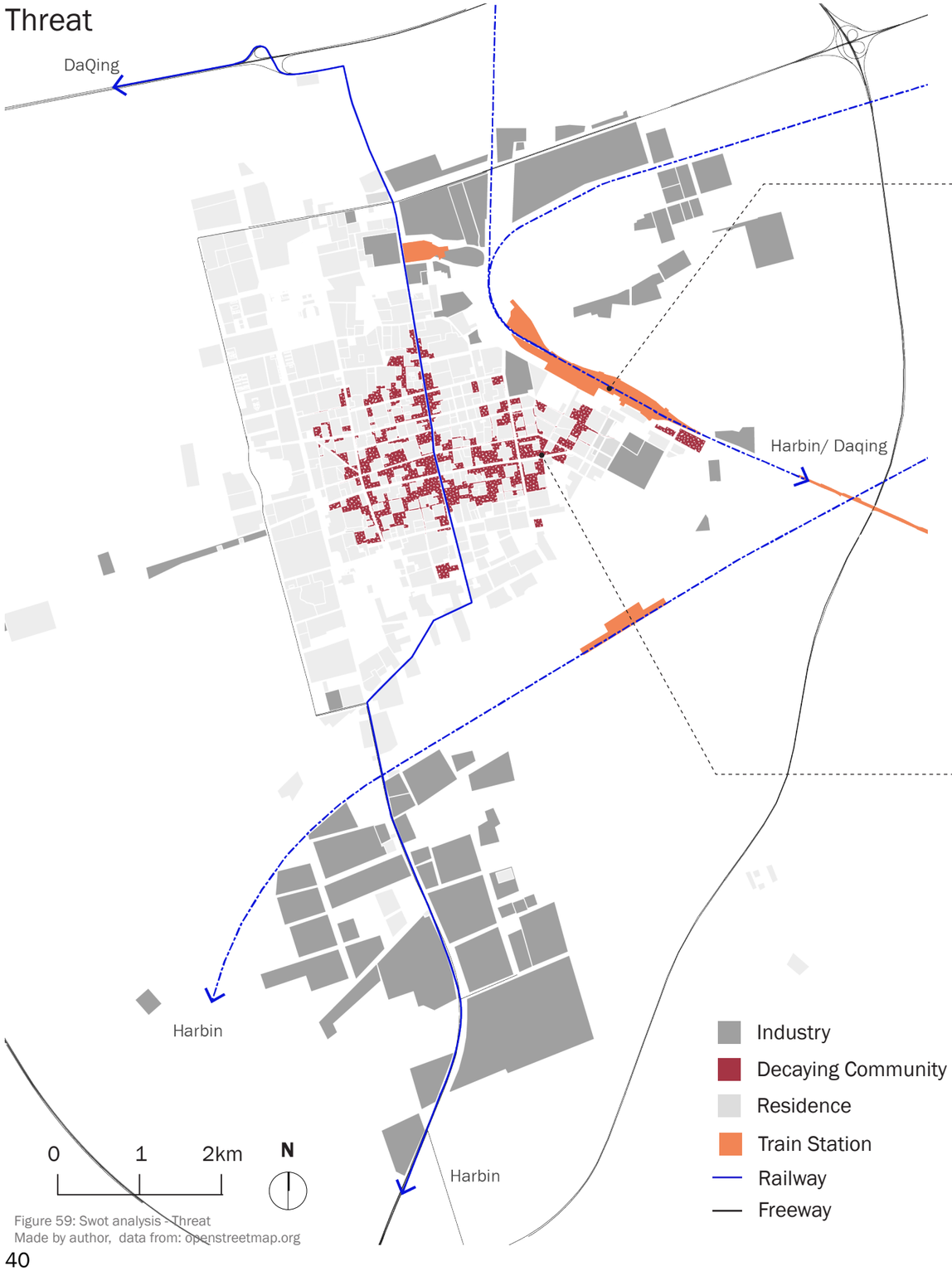
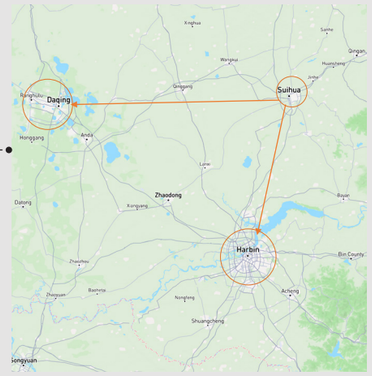


Figure 59: Swot analysis - Threat
Made by author, data from: openstreetmap.org



T1 Regional competition and the siphoning effect from Harbin and Daqing

Figure 60
Source: Google map

T2: Decaying neighborhood due to drastic population loss.

Figure 61: Decaying city environment in Suihua
Photographs by author

5.3 SHRINKAGE IDENTIFICATION

Population Dynamic Distribution

Source: Baidumap, real-time heatmap

Spatial Distribution of Depopulated Communities and Urban Decay

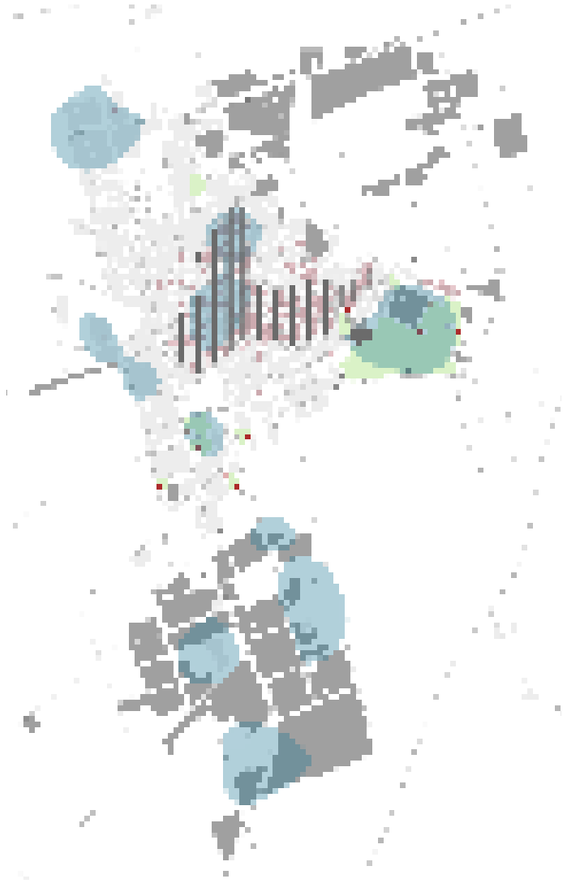


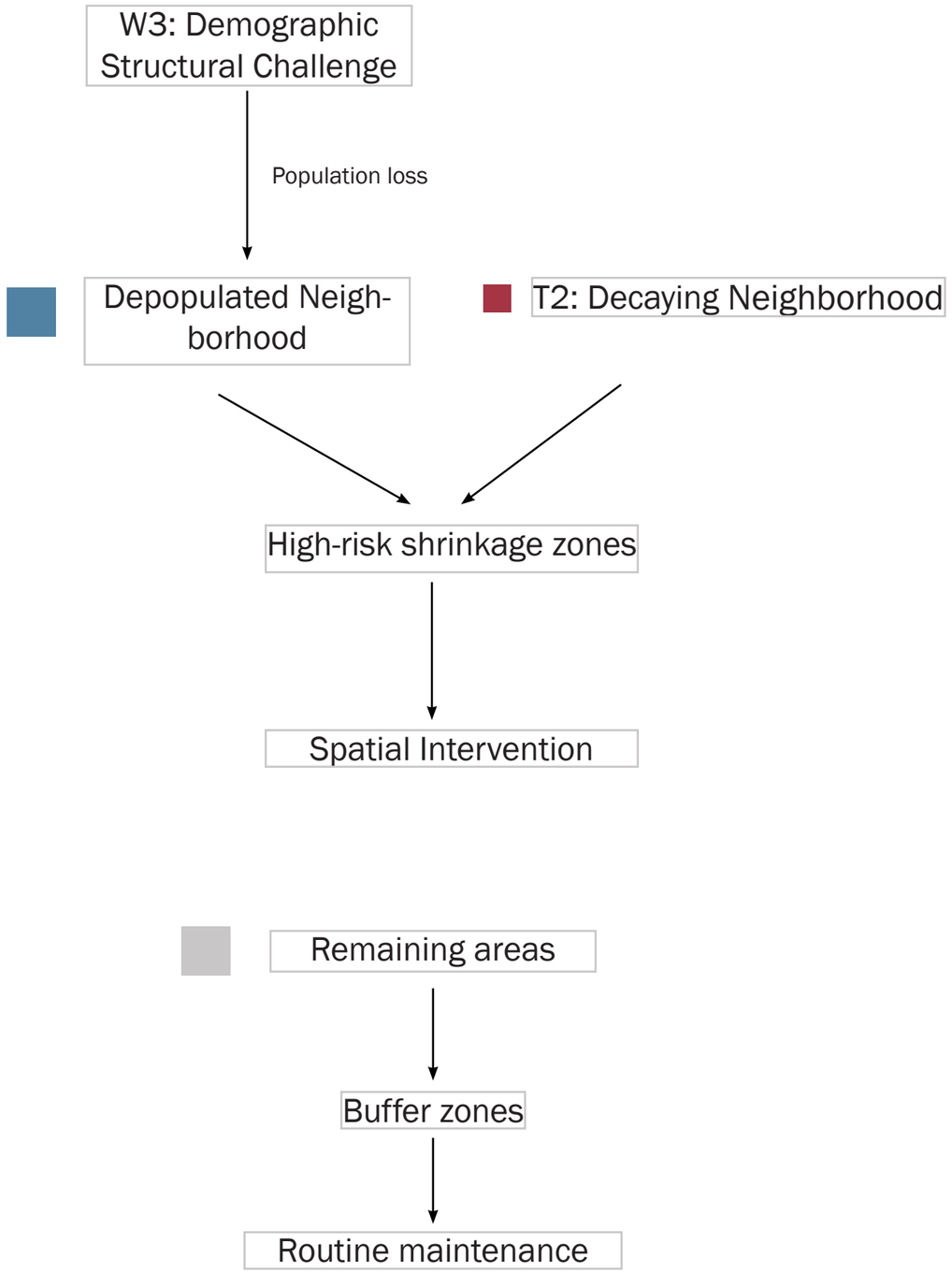
Figure 62: Heatmap of urban population distribution
Made by Author, based on Baidumap, google map, open street map

Shrinkage Typology Identification

Figure 63: Spatial distribution of different shrinkage typologies
Made by Author, based on Baidumap, google map, open street map

Baidu Maps provides a city heat map that is generated based on the number of users per unit area. When an area has a high number of users, it appears red, while areas with fewer users appear blue. Using this data, it is possible to roughly depict the distribution of people within the city. For my analysis, I used data from 6 PM, as this is the time when most people are either finishing work or school. At this time, Baidu Maps captures a larger volume of user activity, and the distribution more accurately reflects which areas of the city are vibrant and active.

5.3 SHRINKAGE IDENTIFICATION



The spatial distribution of various urban elements, when overlaid with depopulated communities and urban decaying spaces, reveals four distinct types of urban spatial contraction.

Areas experiencing severe population loss (marked as blue zones) and those with significant environmental deterioration (designated as hatched areas) are identified as high-risk contraction zones that will be prioritized for spatial intervention. The remaining areas, presenting lower risks, are classified as contraction buffer zones that still maintain resilience and urban vitality, for which routine maintenance is recommended.

Therefore, this plan primarily focuses on the governance of high-risk contraction zone

5.4 SHRINKAGE TYPOLOGIES

5.4.1 Typology 1 —— Underutilized Prime Downtown

Identified by: T2

Source: Google satellite map(2024)

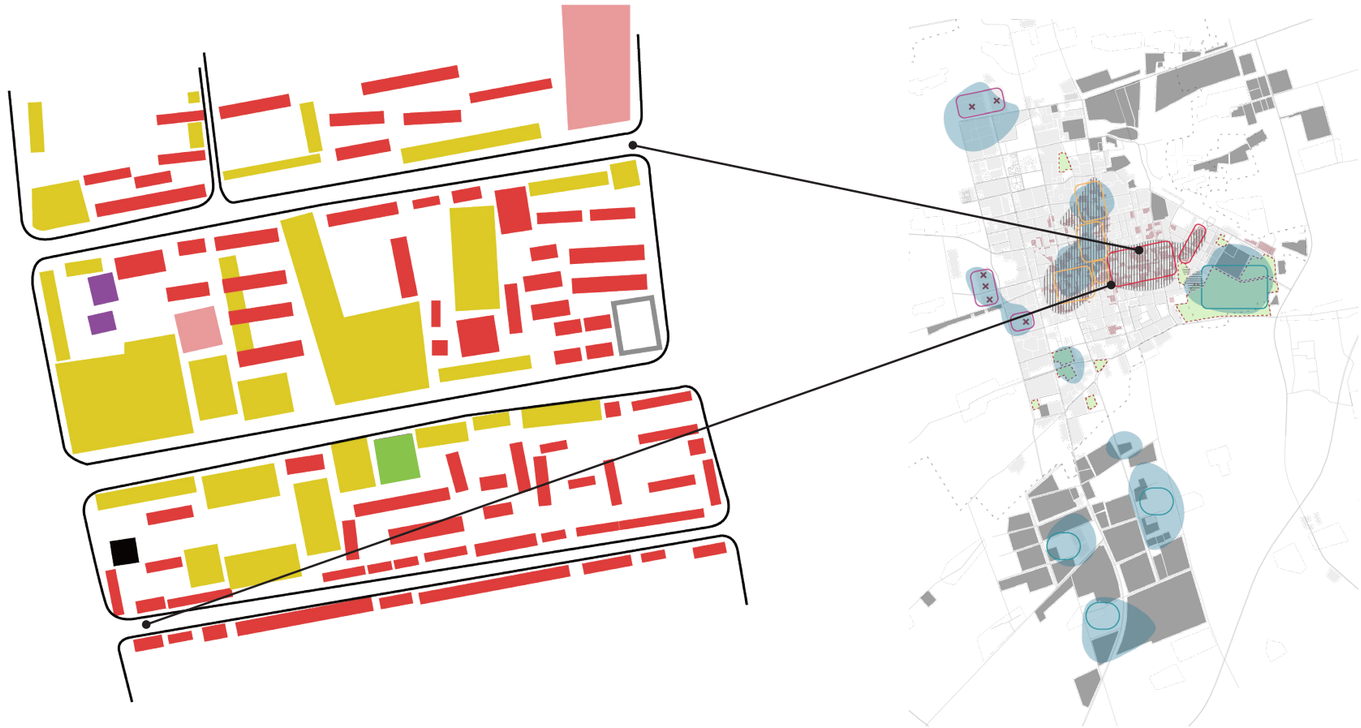


Figure 64: Spatial layout of typology1
Made by Author

Figure 63: Spatial distribution of different shrinkage typologies
Made by Author, based on Baidumap, Google map, open street map

The core commercial district of Beilin City serves as the vibrant heart of the urban area and the busiest part of the city, characterized by mixed-use functions. Located along the city's central axis, this area has a long history, and residents are accustomed to coming here for shopping, leisure, and entertainment. However, the spatial environment is poor, with heavy but chaotic traffic where motorized and non-motorized vehicles share the same lanes. The surrounding area consists of old residential neighborhoods.

- Typology 1
- Commercial
- Aging Construction
- Office Building
- School
- Idle Land
- Abonded Building

5.4 SHRINKAGE TYPOLOGIES

5.4.2 Shrinkage Typology 2——Decaying City Center

Identified by: T2, W3

Soure: Google satellite map(2024)

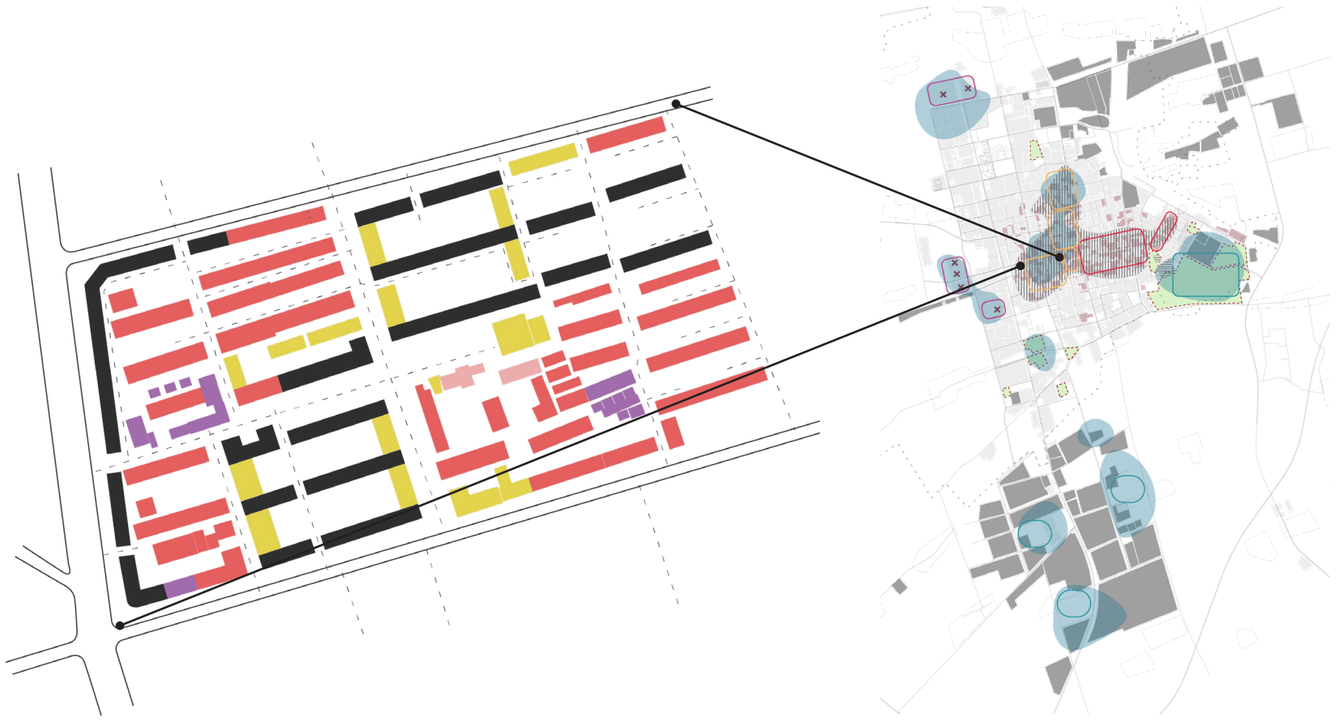


Figure 65: Spatial layout of typology2
Made by Author

Figure 63: Spatial distribution of different shrinkage typologies
Made by Author, based on Baidumap, google map, open street map

This region forms a closed space characterized by densely distributed residential buildings, most of which were constructed before 2000 and are in poor condition due to inadequate maintenance. Additionally, the area is marked by widespread aging infrastructure. Furthermore, as a result of the earlier relocation of government offices, many abandoned former government buildings remain in this region.

Typology 2
Commercial
Aging Residence Construction
Residence
School
Abonded Building

5.4 SHRINKAGE TYPOLOGIES

5.4.3 Typology 3——Unwelcome New Town

Identified by: W3

Soure: Google satellite map(2024)

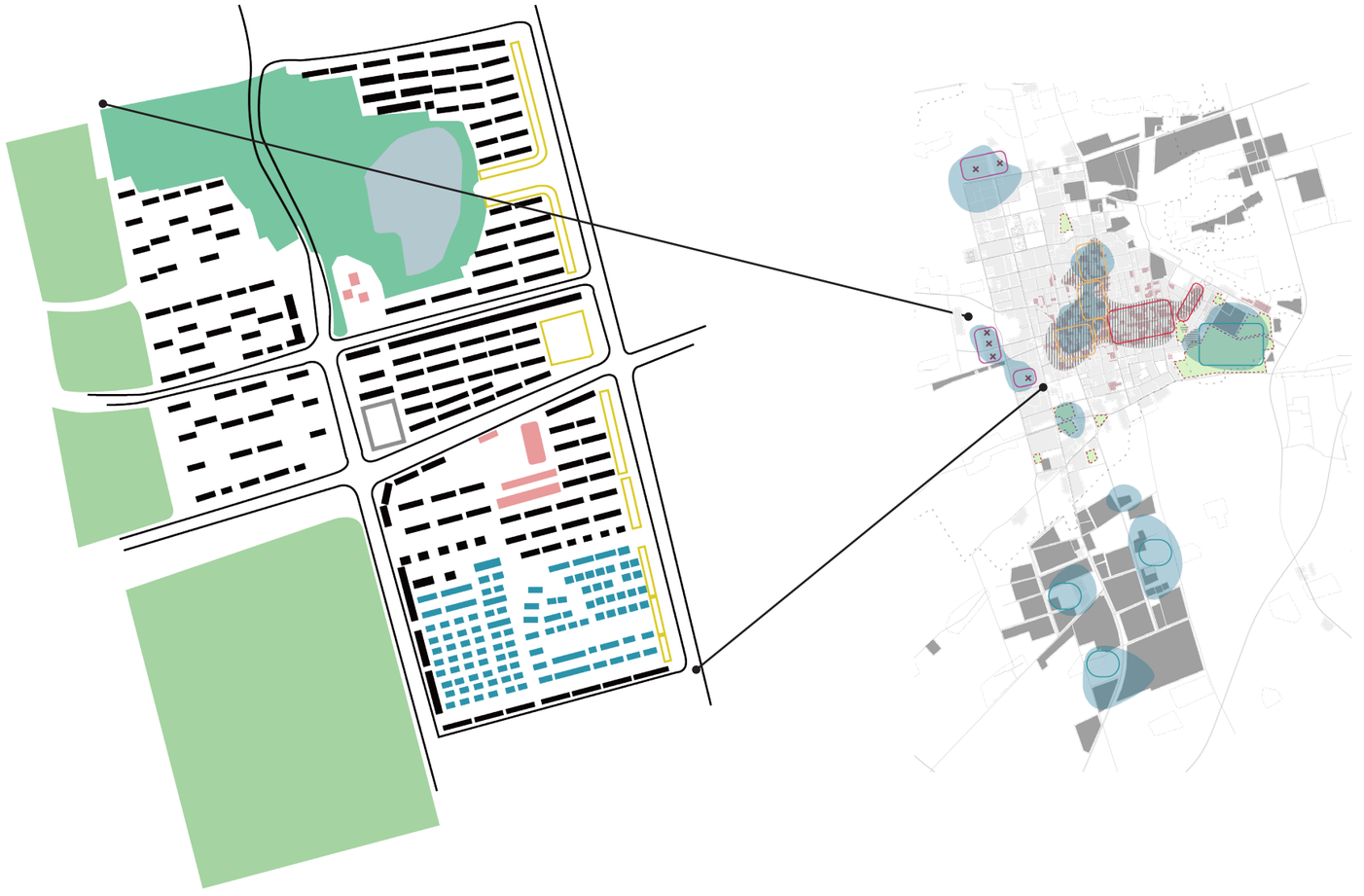


Figure 66: Spatial layout of typology3
Made by Author

Figure 63: Spatial distribution of different shrinkage typologies
Made by Author, based on Baidumap, google map, open street map

These areas have the highest building density but the lowest foot traffic. They feature monotonous spatial forms and single-function land use, located far from the city center and public service facilities. Additionally, they are physically isolated by surrounding infrastructure.

5.4 SHRINKAGE TYPOLOGIES

5.4.4 Typology 4 —— Idle Land

Identified by: W3

Soure: Google satellite map(2024)

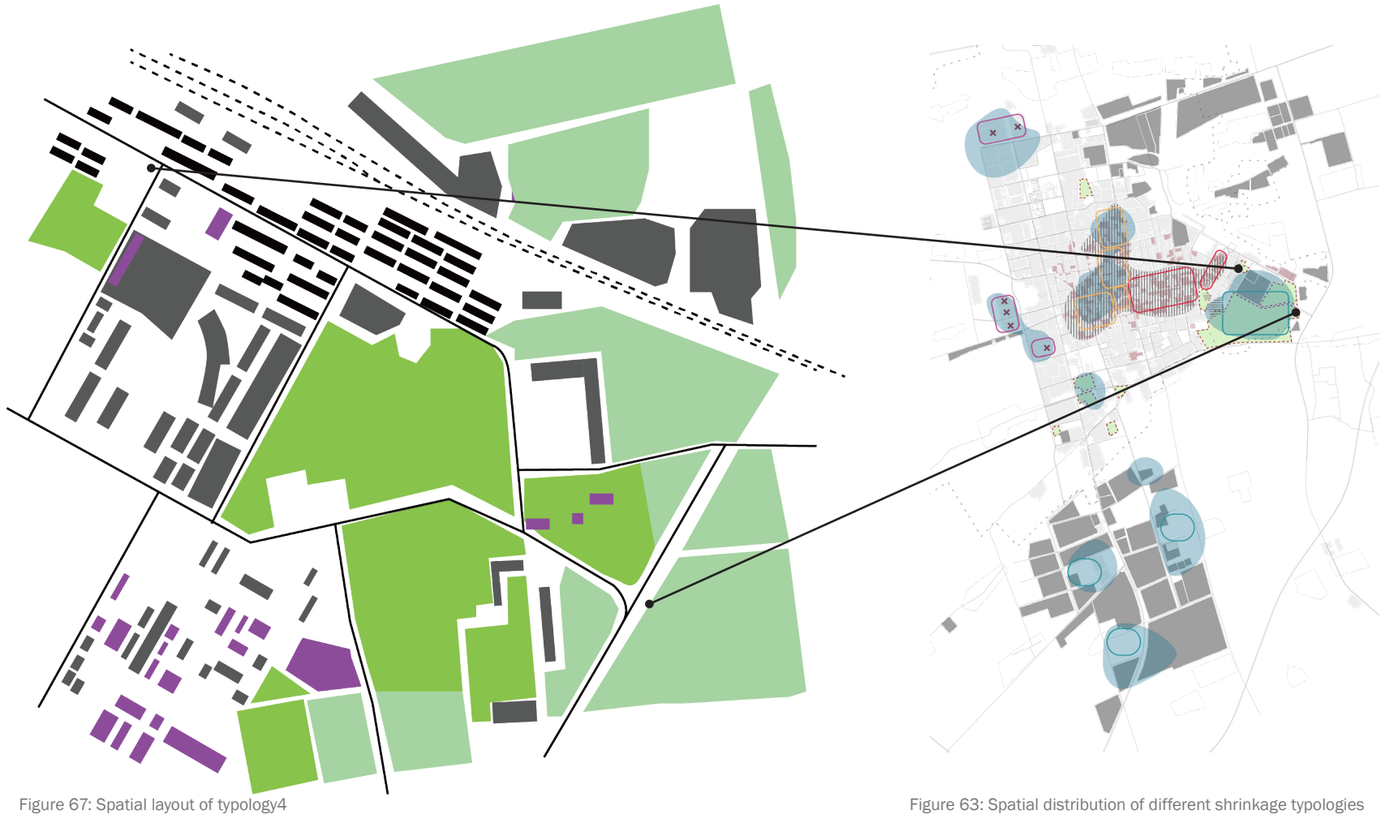


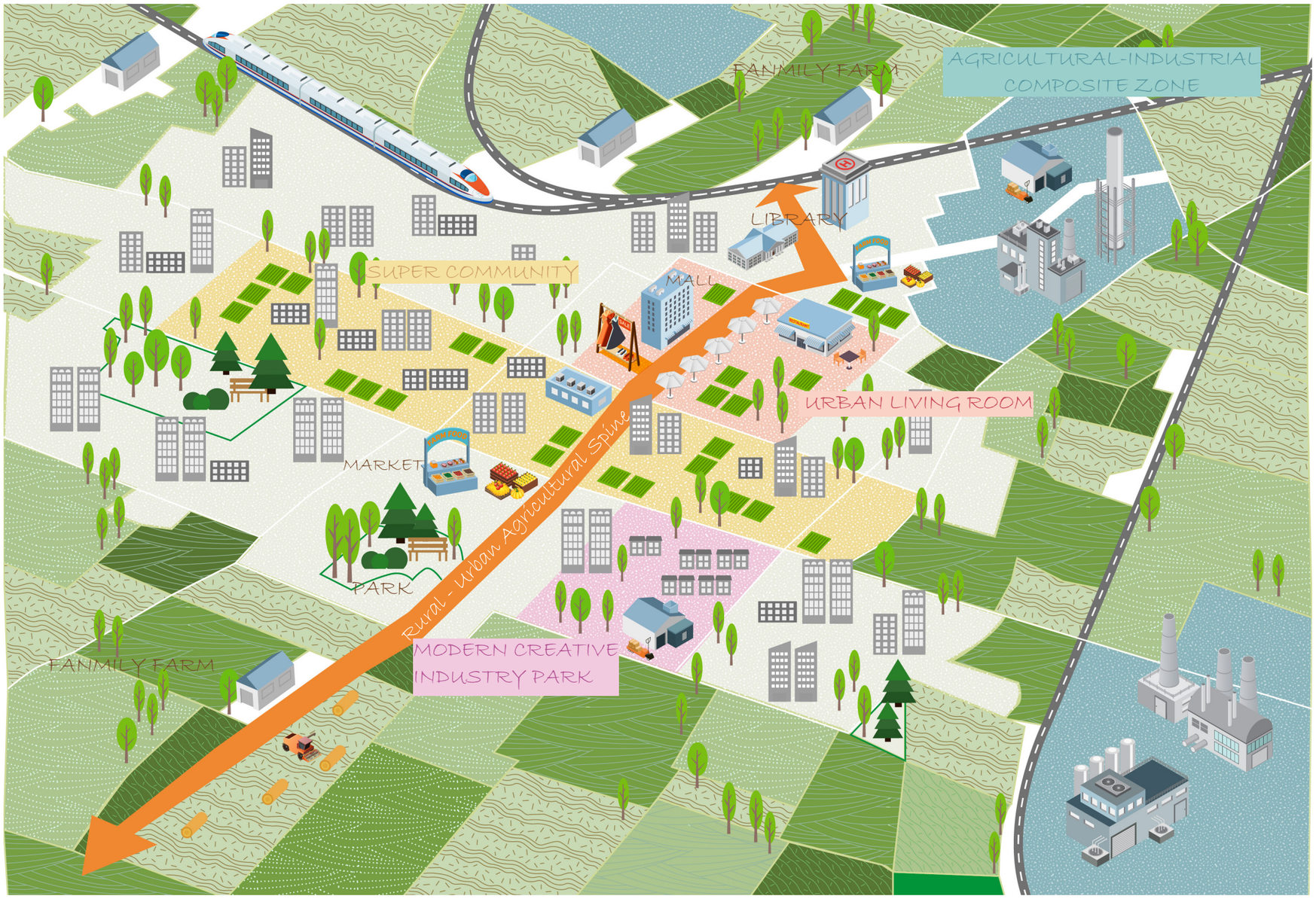
Figure 67: Spatial layout of typology4
Made by Author

Figure 63: Spatial distribution of different shrinkage typologies
Made by Author, based on Baidumap, google map, open street map

This area, located near the eastern edge of the urban district and close to the train station, was previously a rural settlement before being demolished. The cleared land has been left unmanaged, transforming into an urban grassland. To the east lies farmland, while to the west is a large industrial zone with low utilization, marked by numerous abandoned industrial facilities.

06 Vision

6.1 VISION STATEMENT



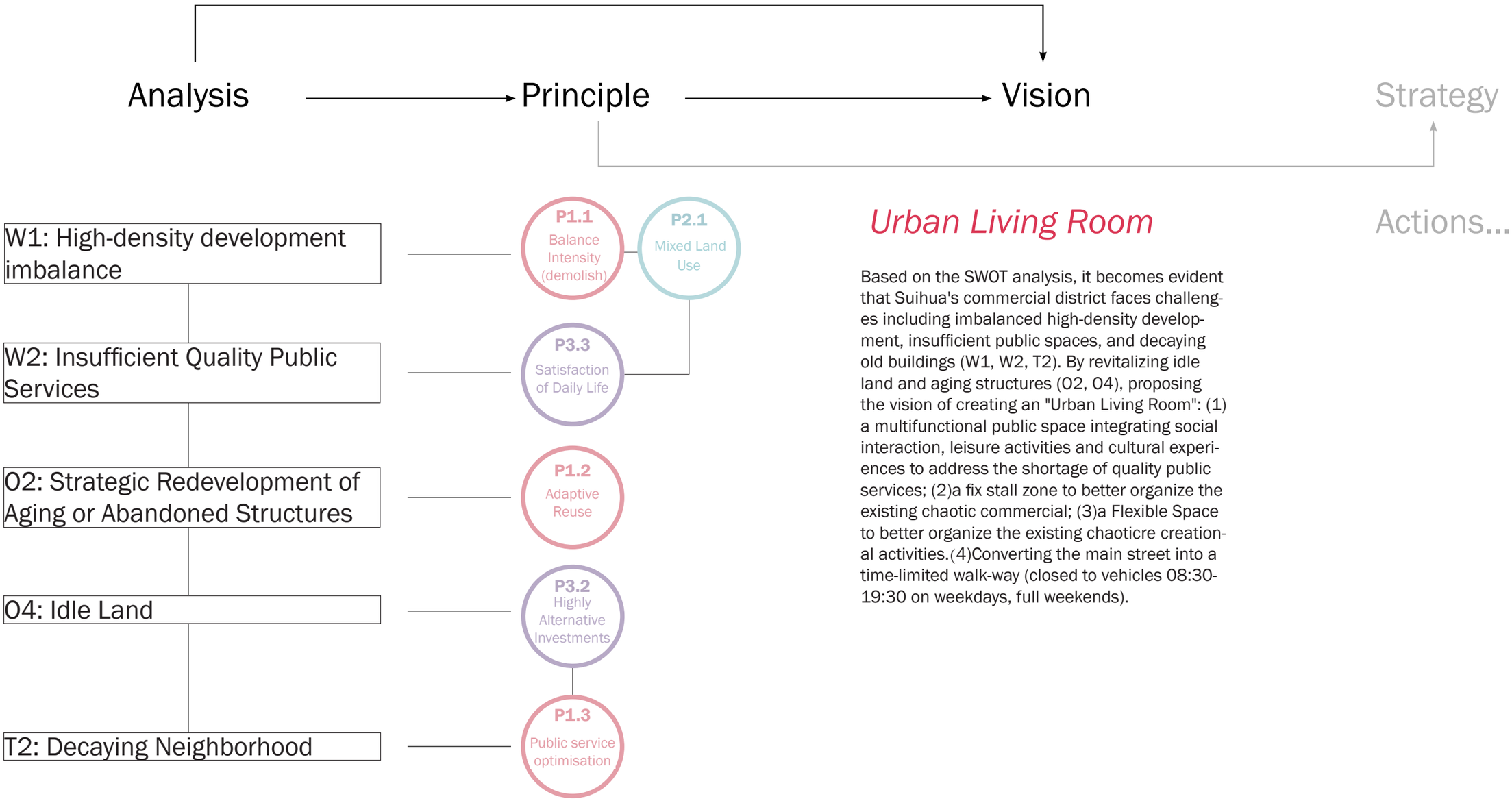
By 2040, Suihua will become a nationally renowned agro-cultural city, Acheiving the goal of **Spatial Efficiency**, **Urban-Rural Economic Growth** and **Social Cohesion**. attracting outsiders with its distinctive agricultural products and offering a unique rural lifestyle.

Through proactive smart shrinkage and adaptive reuse strategies, the city will reorganize land use and restructure its agricultural and industrial systems to achieve both Spatial Efficiency and Economic Growth .

This process will ensure equitable distribution of resources and social welfare, where both the city and countryside achieve shared economic growth.

6.2 SMART SHRINKAGE BY TYPOLOGY 1

From Analysis to Vision



Urban Living Room

Actions...

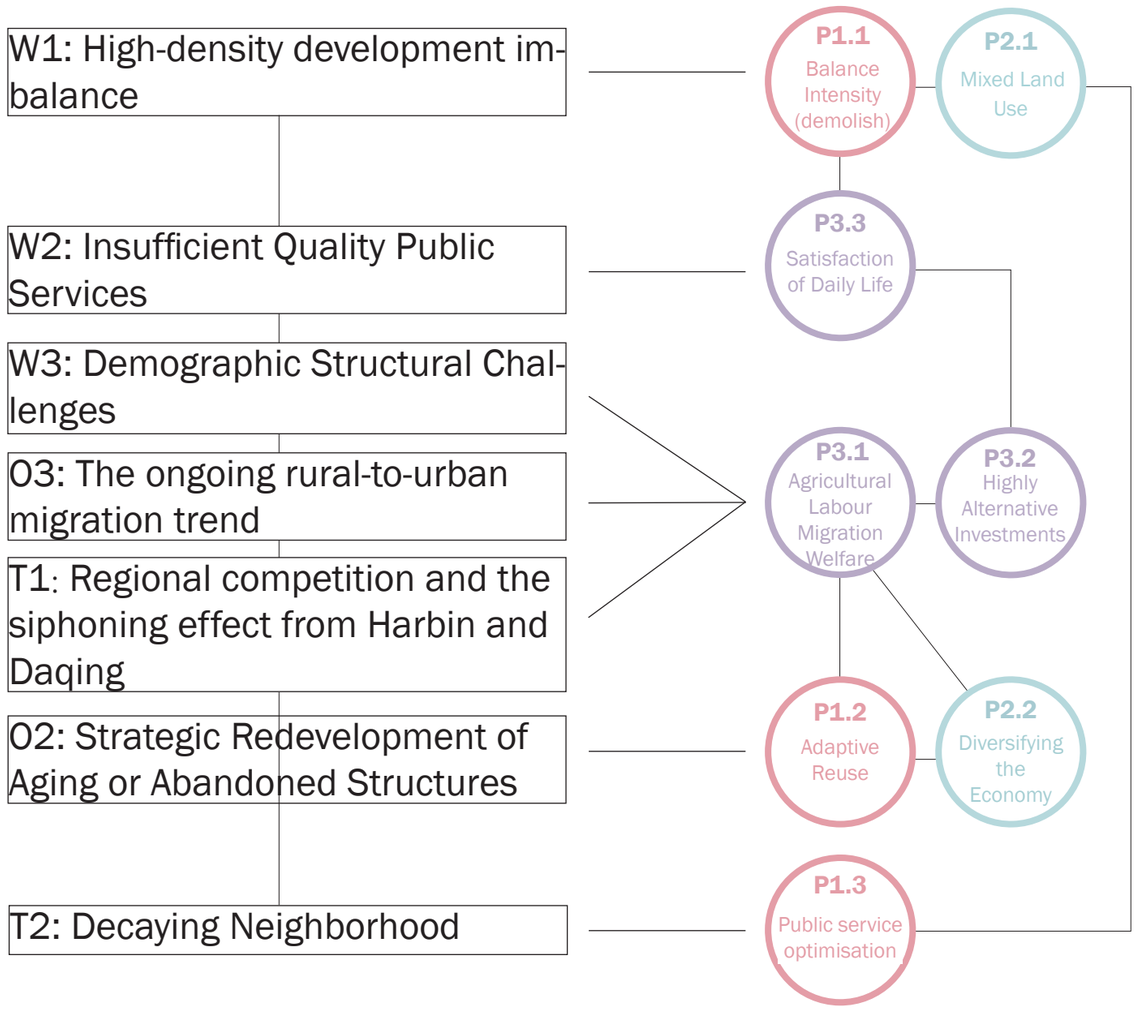
Based on the SWOT analysis, it becomes evident that Suihua's commercial district faces challenges including imbalanced high-density development, insufficient public spaces, and decaying old buildings (W1, W2, T2). By revitalizing idle land and aging structures (O2, O4), proposing the vision of creating an "Urban Living Room": (1) a multifunctional public space integrating social interaction, leisure activities and cultural experiences to address the shortage of quality public services; (2)a fix stall zone to better organize the existing chaotic commercial; (3)a Flexible Space to better organize the existing chaoticre creational activities.(4)Converting the main street into a time-limited walk-way (closed to vehicles 08:30-19:30 on weekdays, full weekends).

6.2 SMART SHRINKAGE BY TYPOLOGY 1

Vision of Typology 1 ——Urban Living Room

6.3 SMART SHRINKAGE BY TYPOLOGY 2

From Analysis to Vision



Super Community

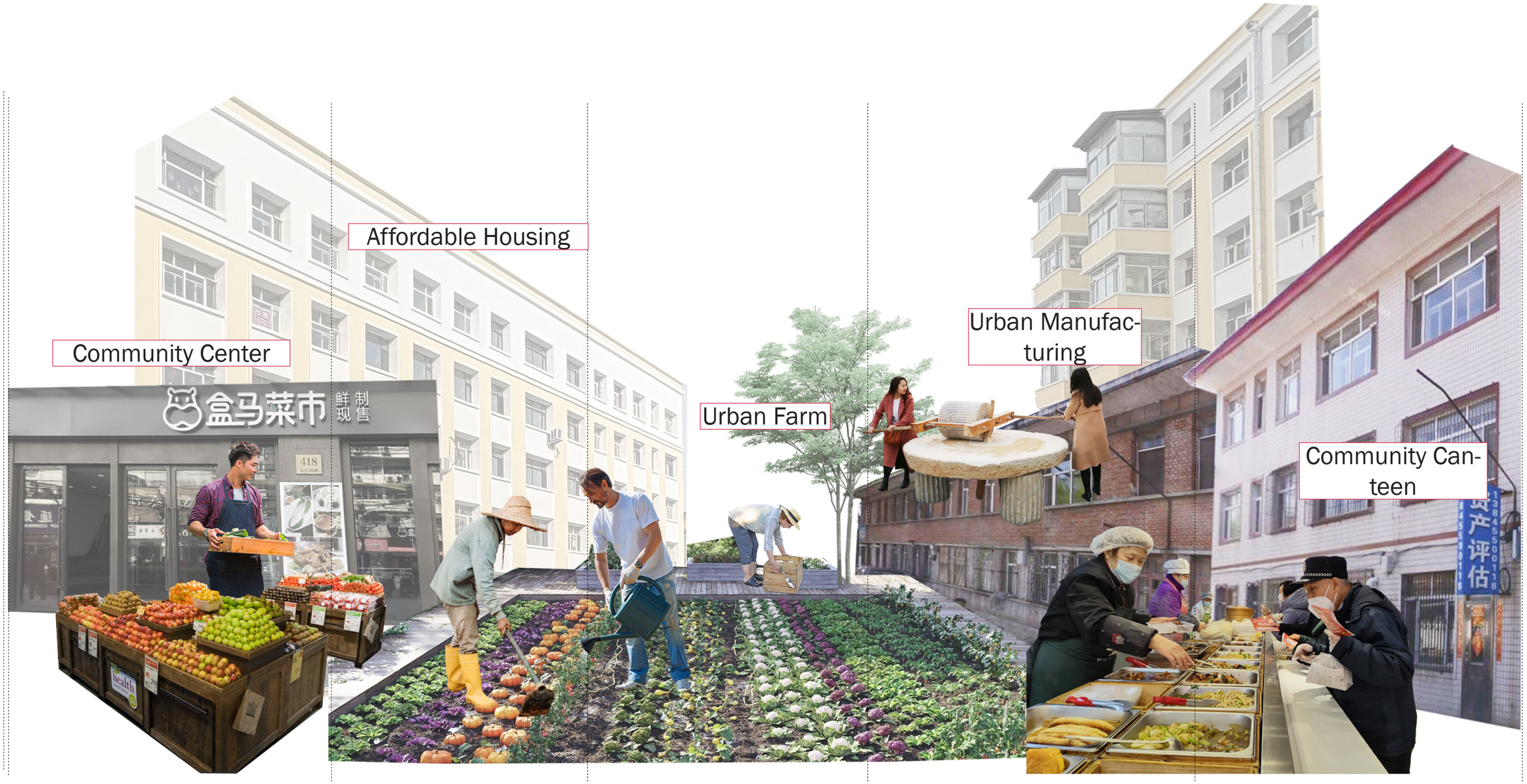
Actions...

This shrinkage typology is identified by: decaying built environments (T2) and Depopulated Neighborhood due to significant population loss (W3). To counter these trends, the proposal leverages ongoing rural-urban migration (03) by establishing a "Super Community" that enhances regional attractiveness amidst competition from Harbin/Daqing (against T1).

Targeting challenges of inadequate public services (W2) and high-density development imbalance (W1), the community will feature:
(1) Adaptive reuse of vacant buildings to provide affordable migrant housing,
(2) Strategic rehabilitation of select structures to upgrade public services (02)
(3) Integrated community farms, develop a hybrid economic model combining "Community Supported Agriculture (CSA) with traditional commerce", with produce directly supplying community kitchens or being sold at organic food markets. Simultaneously, introducing small-scale industries such as primary agricultural processing and handicraft production to form a complete "cultivation-processing-sales-consumption" value chain.preserving agricultural heritage while generating economic value - all designed to improve livability (addressing W1/W2) and competitiveness (mitigating T1/T2).

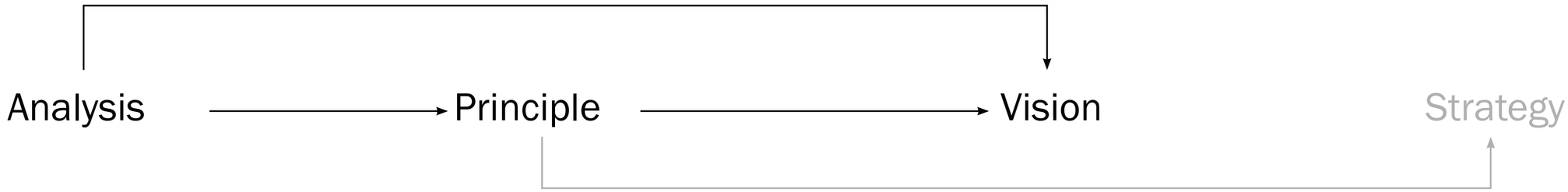
6.3 SMART SHRINKAGE BY TYPOLOGY 2

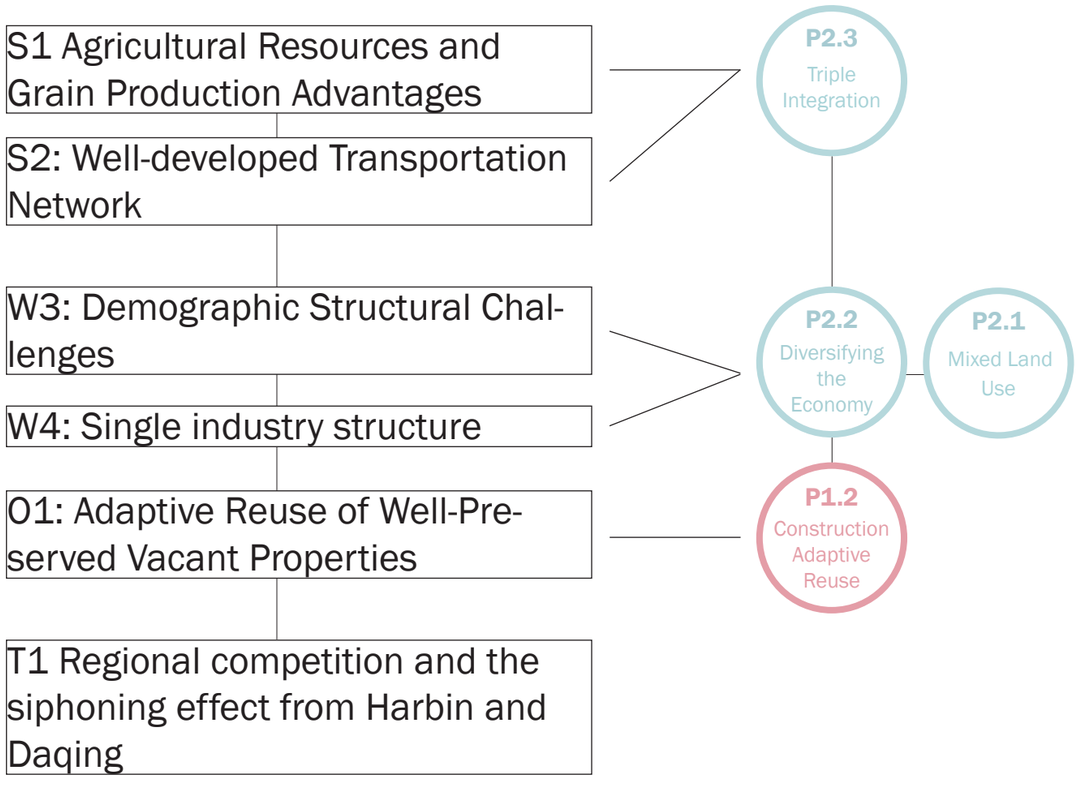
Vision of Typology2 —Super Community



6.4 SMART SHRINKAGE BY TYPOLOGY 3

From Analysis to Vision Typology 3





Modern Creative Industry Park

Actions...

This shrinkage typology is identified by Depopulated Neighborhood due to significant population loss.

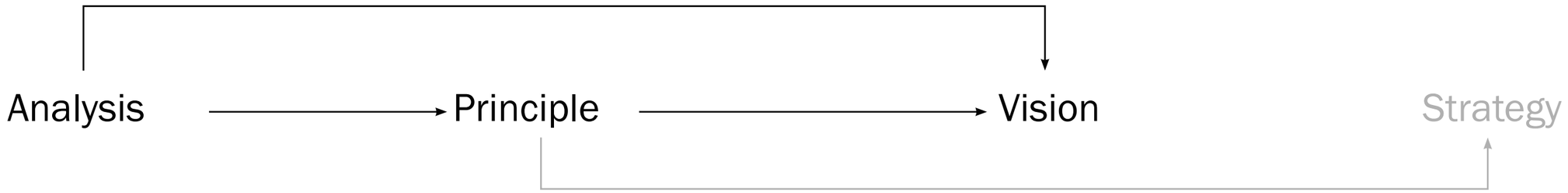
This proposal will utilize Suihua's Agricultural Resources and Grain Production Advantages (S1) and Well-developed Transportation Network (S2) to develop agricultural innovation industries.
The plan involves adaptively reusing the large number of vacant but structurally sound buildings in this site to create an Agricultural Characteristic Innovation Industrial Park(O2). This initiative will strengthen and improve the agricultural industrial system (to counter W4), enhance urban competitiveness (against T1), provide more diverse employment opportunities, and attract younger populations (mitigating W3).

6.4 SMART SHRINKAGE BY TYPOLOGY 3

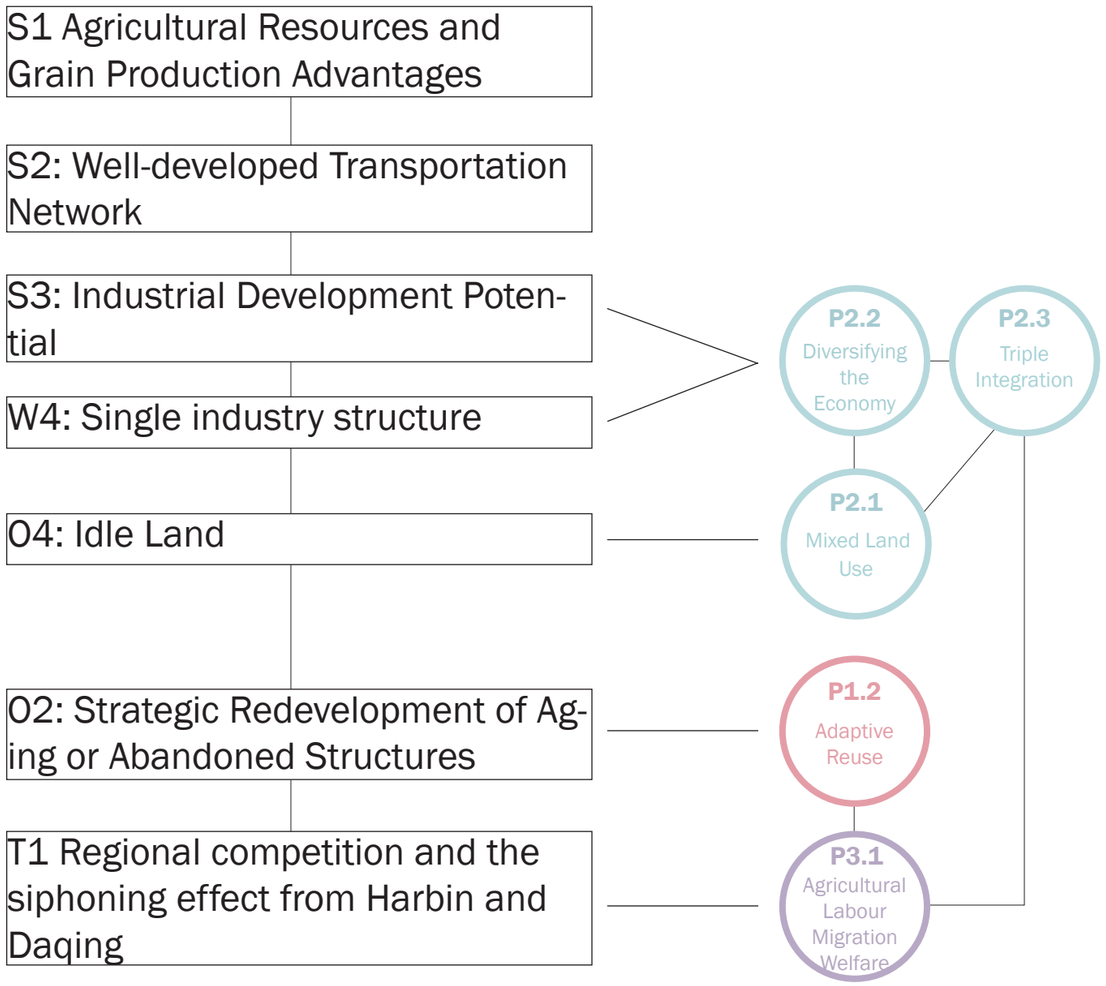
Vision of Typology 3 — Modern Creative Industry Park

6.5 SMART SHRINKAGE BY TYPOLOGY 4

From Analysis to Vision Typology 4



Actions...

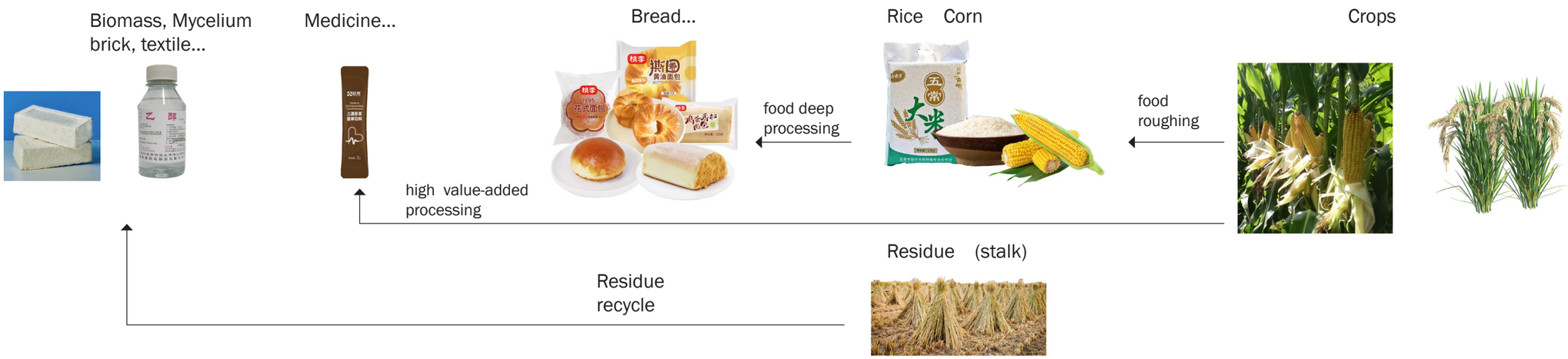


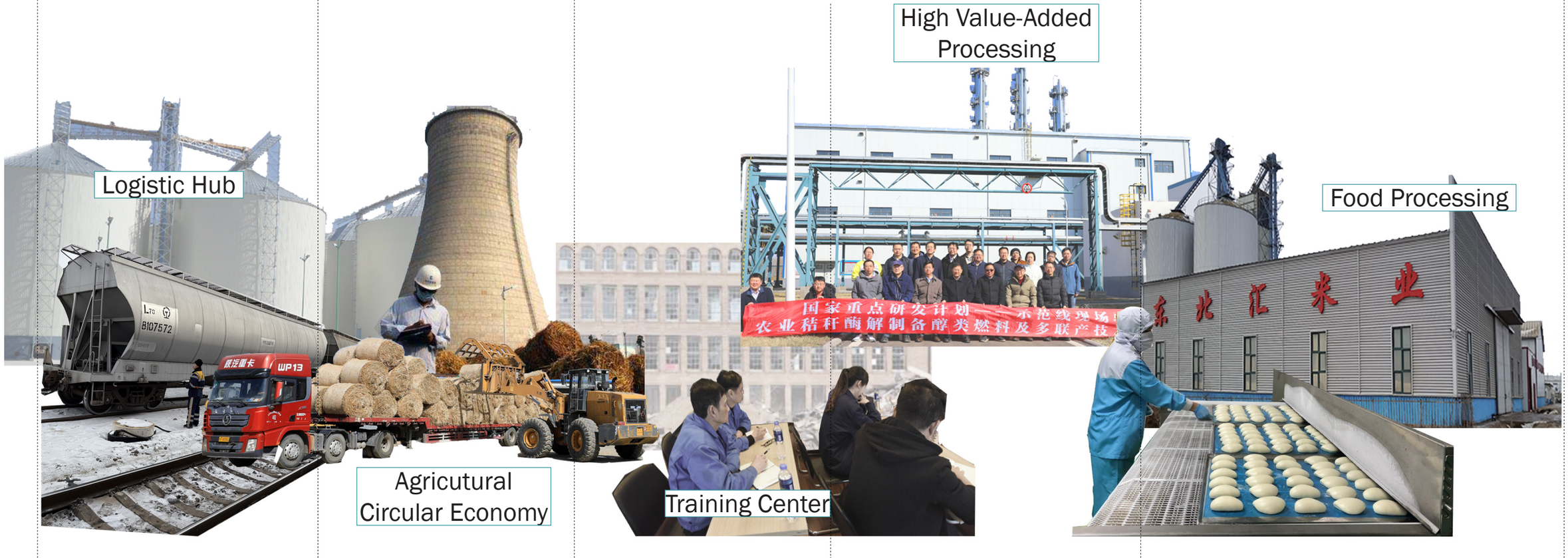
Agricultural-Industrial Composite Zone

The site comprises extensive vacant industrial land adjacent to transportation infrastructure (O4), featuring nascent food processing and pharmaceutical manufacturing sectors that demonstrate Industrial Development Potential (S3), along with numerous abandoned factory buildings (O2). Capitalizing on S1 (Agricultural Resources and Grain Production Advantages) and S2 (Well-developed Transportation Network), proposing the vision of developing a large-scale Triple Integration industrial system to establish an Agricultural-Industrial Composite Zone. This initiative will:
Extend agricultural value chains (addressing W4's single-industry limitation);
Develop advanced crop processing industries to increase the added value of crops, enhance urban competitiveness and economic growth (mitigating T1's regional competition);
Implement strategic reuse of aging structures (O2) through functional conversion.

6.5 SMART SHRINKAGE BY TYPOLOGY 4

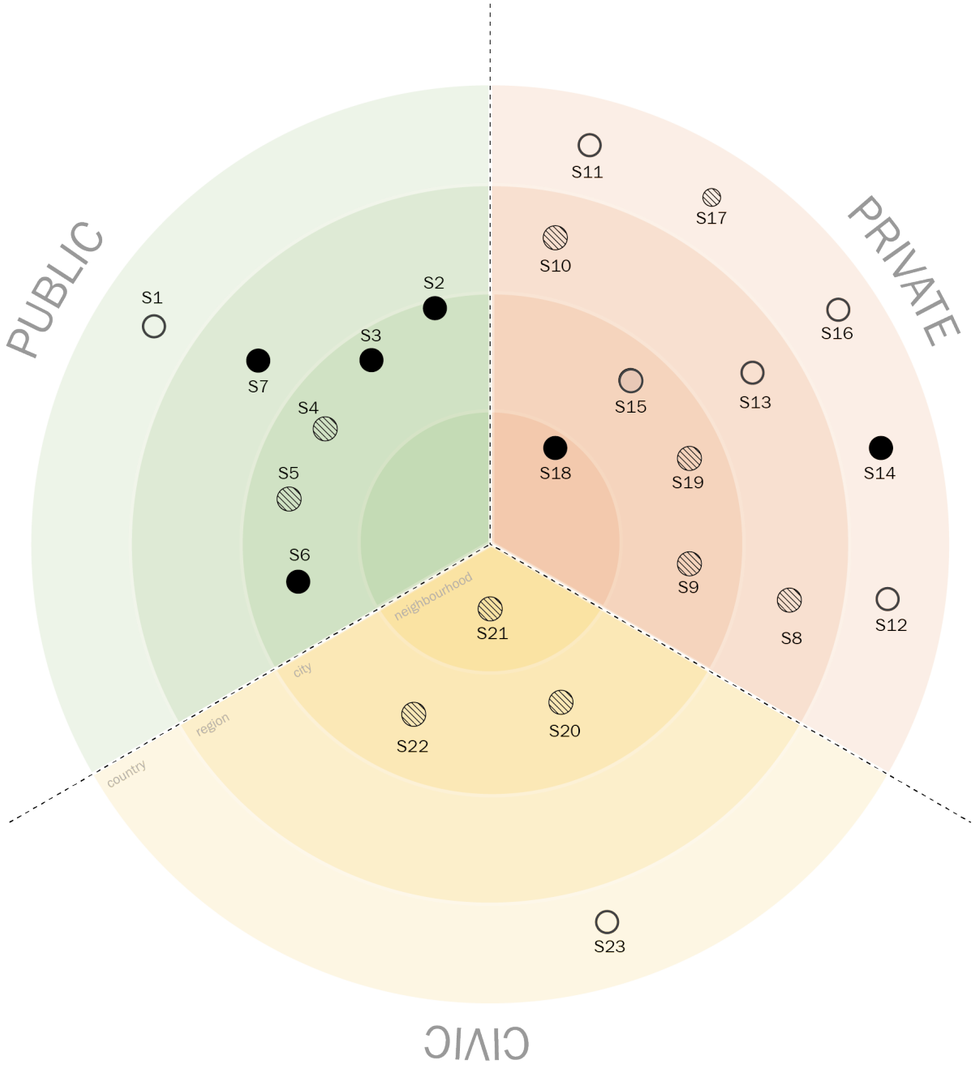
Typology 4 —— Agricultural-Industrial Composite Zone





6.6 STAKEHOLDER ANALYSIS

Actors



Influence on Decision

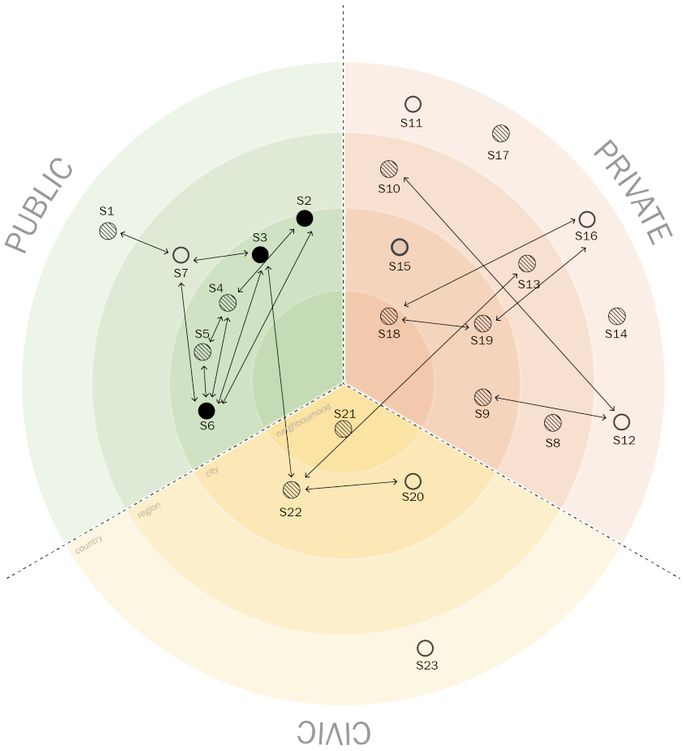
- High
- Medium
- Low

One of the most challenging aspects in the context of urban planning and policy formulation is integrating the needs of different stakeholders. This project uses stakeholder mapping to identify which stakeholders will play a role in this process and how they may work together or conflict with each other.
The diagram analyzes three Sectors of stakeholders involved in smart shrinkage across 4 Typologies including:

PUBLIC SECTOR S1 Central Government S2 Suihua Housing and Urban-Rural Development Bureau S3 Suihua Land and Resources Bureau S4 Suihua Agriculture and Rural Affairs Bureau S5 Suihua Human Resources and Social Security Bureau S6 Suihua Development and Reform Commission S7 Heilongjiang Development and Reform Commission	Public sector consist of various government departments, and in China, the government plays a crucial role. If government policy support is obtained, the involvement of other stakeholders is also encouraged, as they feel more secure and their participation is enhanced. Government departments under the Suihua Municipal Government responsible for land interests(S3), urban-rural construction(S2), land management-idle farmland circulation, agricultural reform policies(S4), and social welfare distribution employment(S5), policy formulation and dissemination(S6).
PRIVATE SECTOR S8 Food Processing Company S9 High Value-added Processing Company S10 Agricultural Circular Company S11 Planning and Architectural Design S12 Company S13 Agriculture Research Institution S14 Farming Corporation S15 E-commerce Platform S16 Local Supermarket S17 Public Media S18 NGO S19 Community Association Shared Facility Operator	Private sector consist of companies and e-commerce platform driving agricultural-industrial upgrading, NGOs and agriculture research institutions jointly conducting agricultural reform studies, as well as community associations and shared facility operators who will be responsible for the long-term management and operation of the Super Communities and creative industry parks, and public media should actively engaged in public communication and oversight.
CIVIC SECTOR S20 Farmers S21 Citizens S22 Rural Migrants S23 Digital Nomad	Under the context of ongoing smart shrinking, the rural population decreases while the individual farming area for farmers increases. In this process, people who relocate from rural areas to cities are referred to as Rural Migrants. Those who remain in rural areas and operate family farms become farmers.

6.6 STAKEHOLDER ANALYSIS

Collaboration

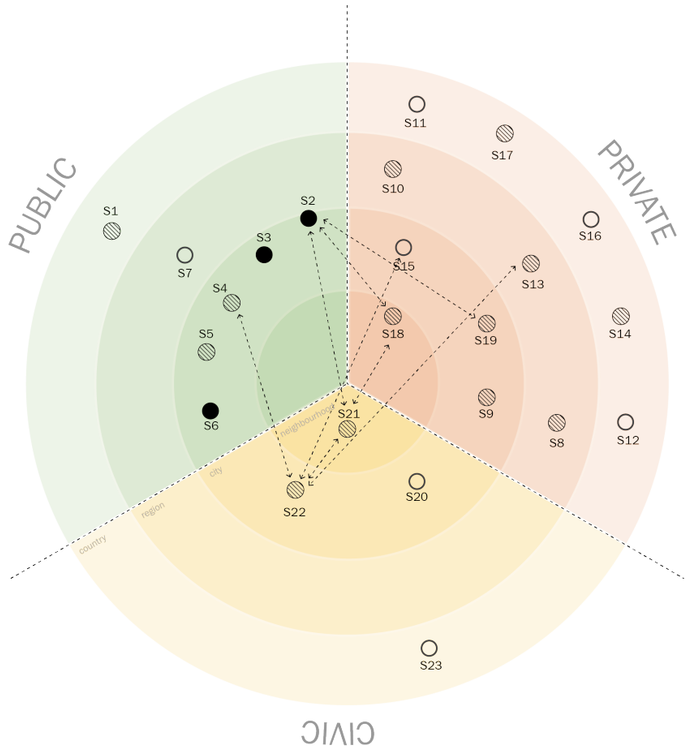


stakeholders collaboration relationship analysis

The public sector exhibits more extensive collaborative connections compared to the private and civic sectors. vertical coordination operates within the multi-level government spanning country, regional, and city tiers, include: land administration and fund allocation. The central government allocates funds to Suihua municipal government, which subsequently conducts land pooling to consolidate land and housing resources for unified implementation of smart shrinkage planning.
Additionally, complex horizontal collaborative relationships exist among municipal departments: S2 coordinates with S4 on "Super Community" planning; S5 jointly conducts farmer skills training programs with S4; S6 oversees interdepartmental resource allocation.

The private sector also exhibits collaborative relationships. Community associations and shared facility operators jointly manage and operate community spaces while cooperating with media to promote project outcomes and expand social influence. Agricultural research institutions can provide technical support to agricultural industrial enterprises.

Conflict

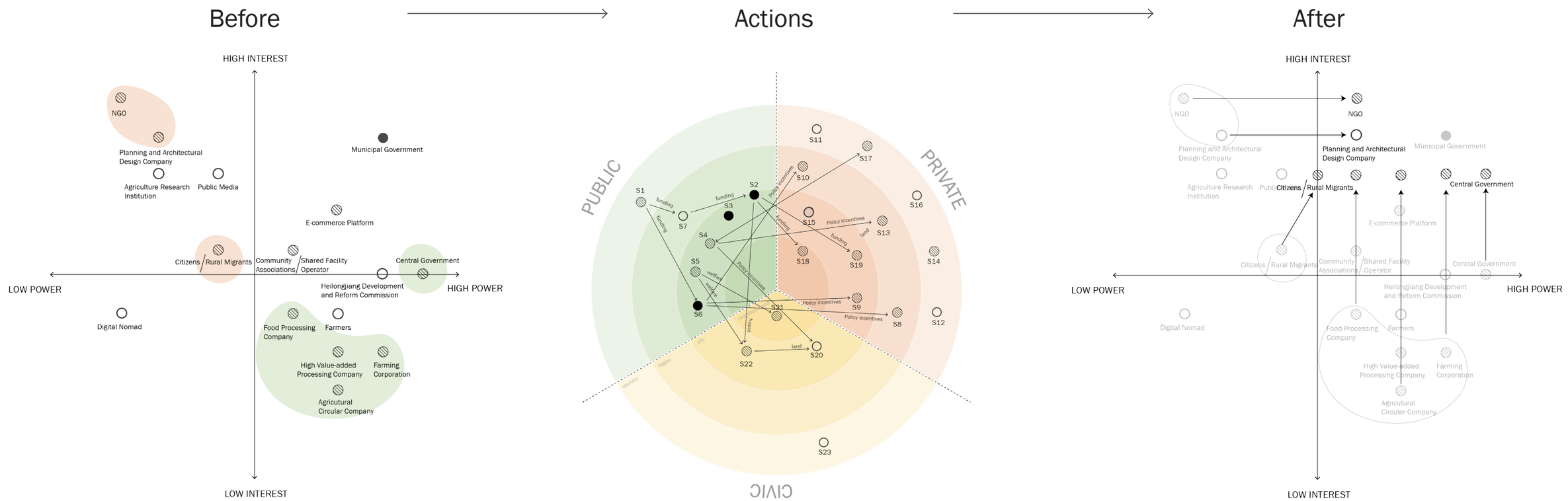


stakeholders conflict relationship analysis

Conflicts over benefit distribution are primarily concentrated in key areas such as land development revenue allocation and industrial chain profit sharing. Disagreements may arise between urban property owners and the government regarding asset redistribution following spatial redevelopment, and some owners may resist the transformation. Particular attention must be paid to divergences between farmers and both government and enterprises concerning compensation standards for land transfers. Furthermore, the challenges of cultural integration among different groups cannot be overlooked, as lifestyle differences between urban residents and rural migrants, along with cultural barriers between digital nomads and traditional communities, may all impact the project's sustainable advancement. Potential ambiguities in spatial management responsibilities and authorities may exist between community association,shared facility operators and government.

6.6 STAKEHOLDER ANALYSIS

Power and Interest



Involvement on planning

- High
- Medium
- Low

Low interest but has high involvement

Low power and has high involvement

Footnote: Due to the complexity of the system, but the similar status in the Power-Interest Matrix analysis, government agencies at city levels are merged into one stakeholder—Municipal government—in this matrix, in order to simplify and clarify the relationships.

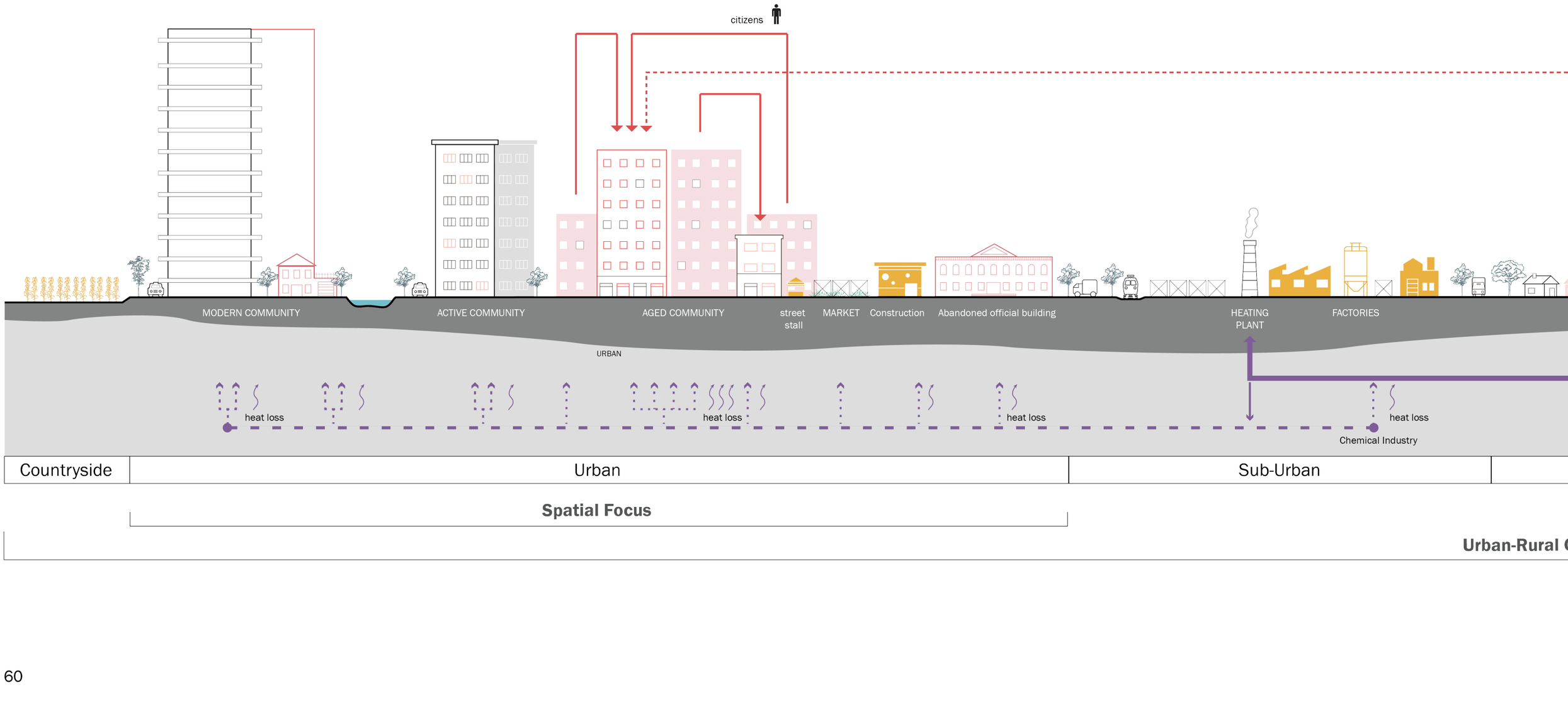
Companies possess high power but low interest, as they tend to invest in larger, more economically vibrant cities, perceiving higher risks in declining urban areas. To attract investment, targeted policy incentives—such as tax breaks, subsidies, and risk mitigation mechanisms—are essential.

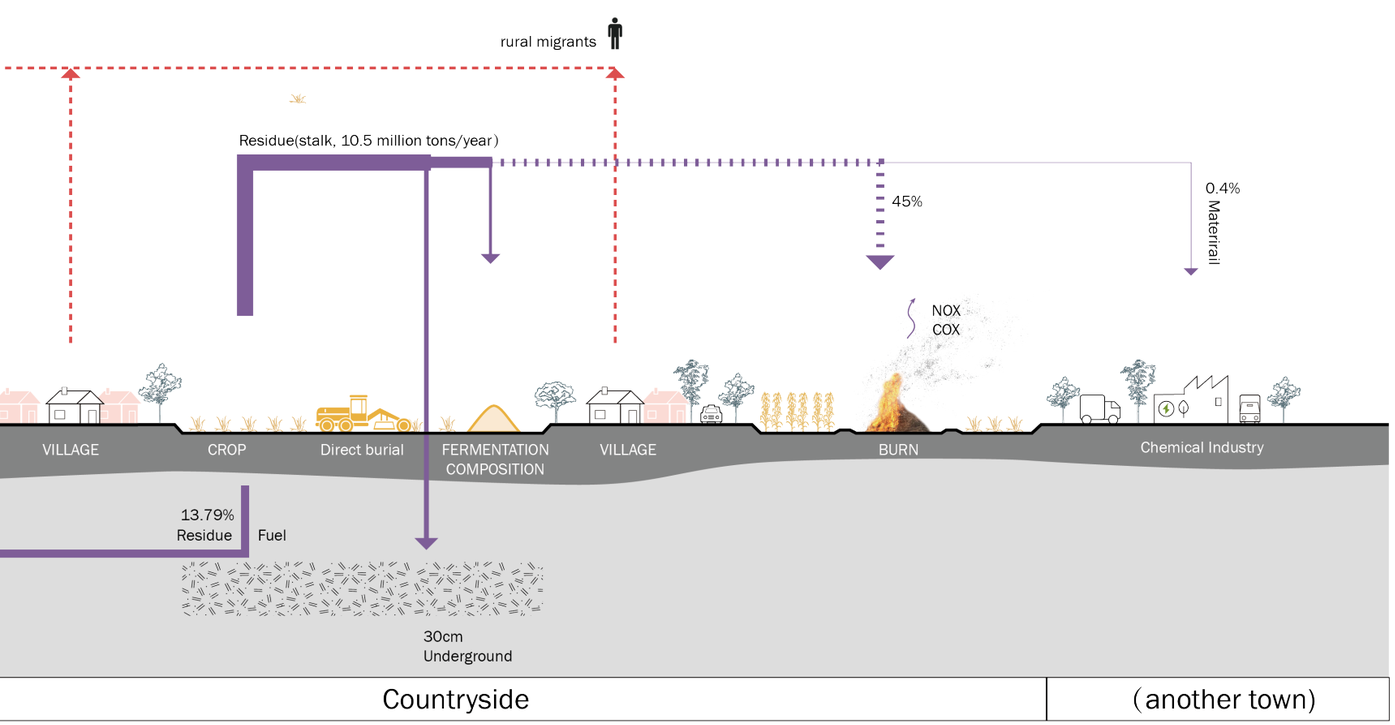
The central government, as the key decision-maker, provides critical funding support. Securing this requires evidence-based policy proposals and quantifiable impact assessments to demonstrate the project's viability.

While rural migrants and urban residents hold limited power, their active participation is vital for success. Retaining rural migrants is crucial to counteracting population decline, yet their interest in relocating to Suihua remains low, as they often prefer larger cities for better opportunities. To address this, the government must enhance welfare provisions (e.g., housing, education, healthcare) and leverage public media campaigns to raise awareness and attract migrants.

For urban residents, cooperation is necessary for spatial reorganization through land pooling, consolidating fragmented land parcels for coordinated redevelopment. To boost engagement, participatory design methods—such as Pattern Language—should be employed to foster resident involvement, communicate a compelling vision, and ensure satisfaction with urban renewal outcomes.

6.7 EXSISTING SITUATION 2025



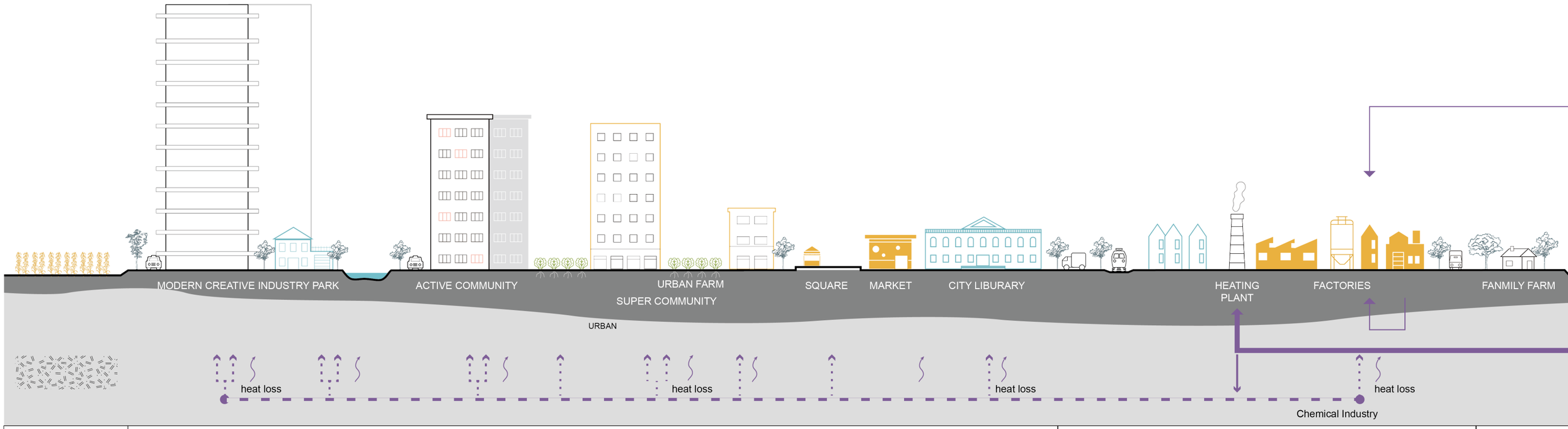


- unutilized construction
- agriculture related construction
- residue flow
- energy flow
- rural migrant flow
- citizen migrant flow

Coordinated Development

6.8 CITY VISION 2040

Modern Creative Industry Park	Super Community	Urban Living Room	Industrial Composite Zone

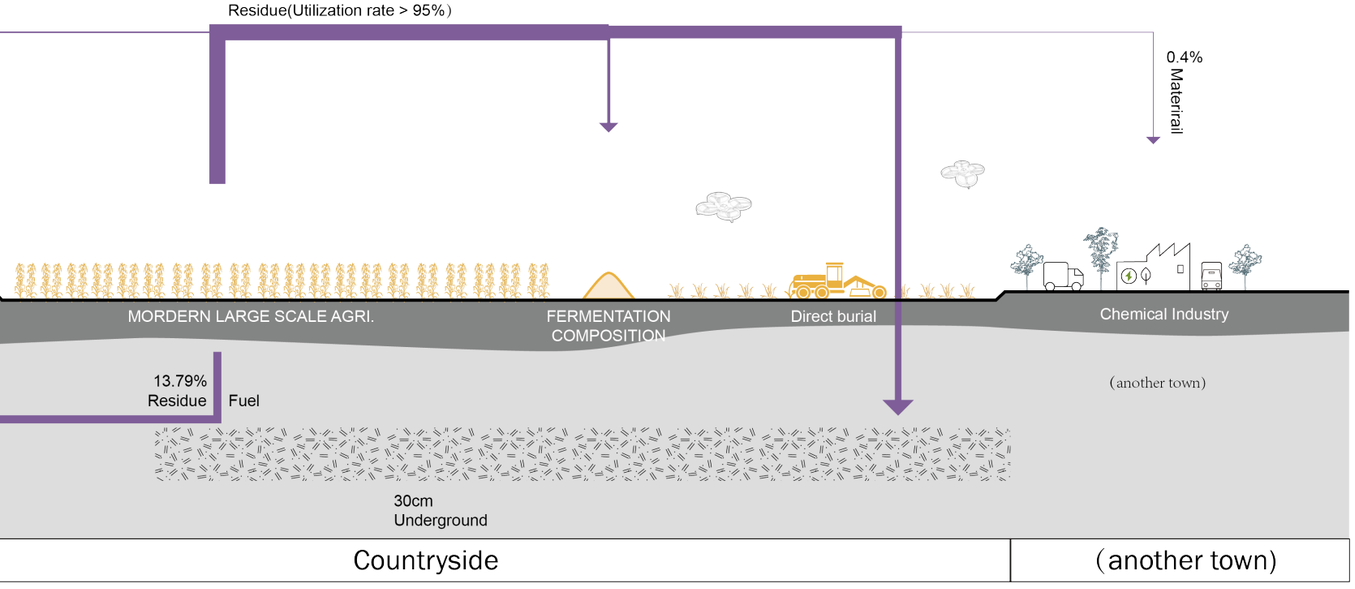


Countryside	Urban	Sub-Urban

Spatial Efficiency

Social Cohesion & Urban-Rural Economic Growth

Morden Large Scale Agricultural Production Base



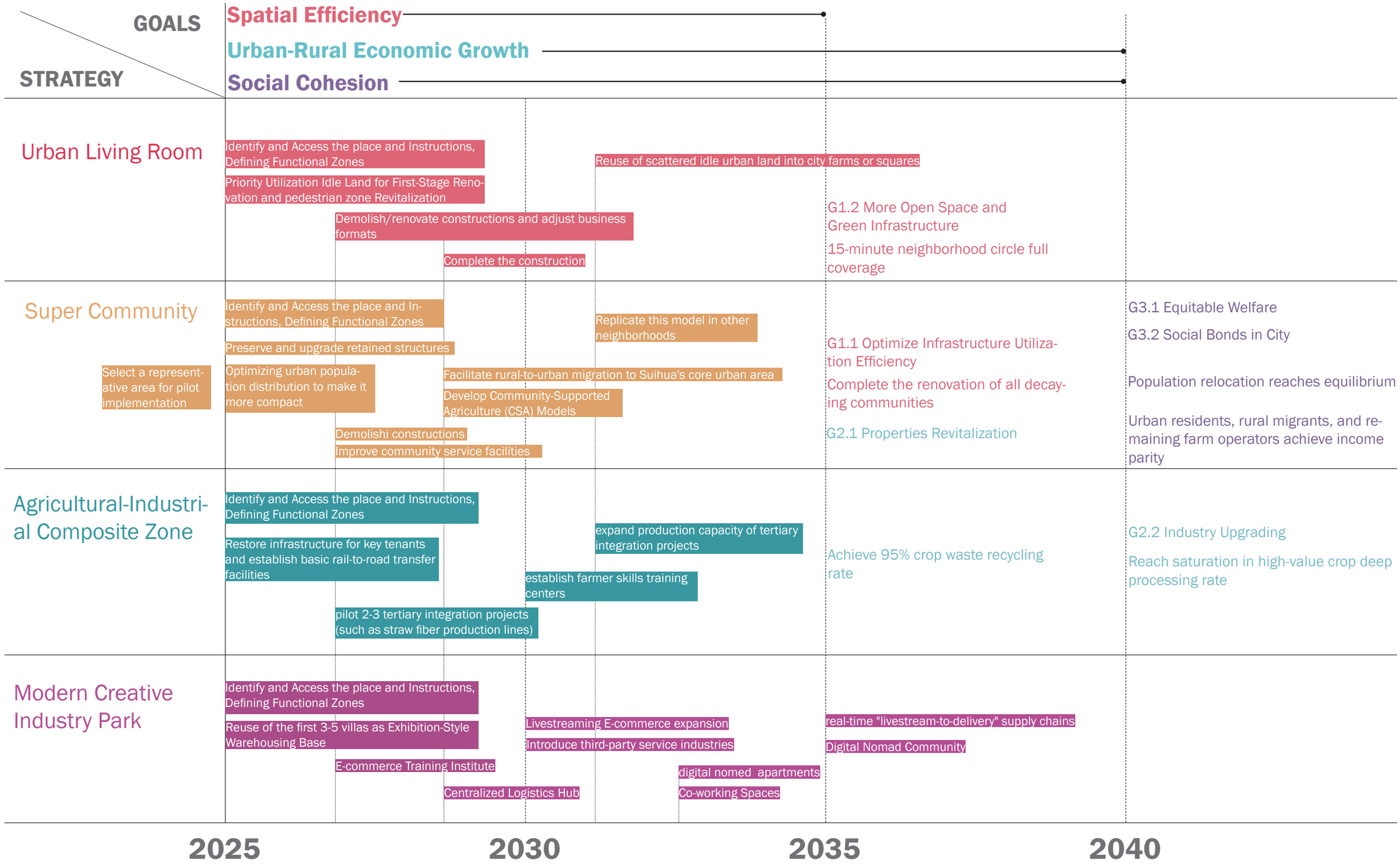
reused/new construction

residue flow

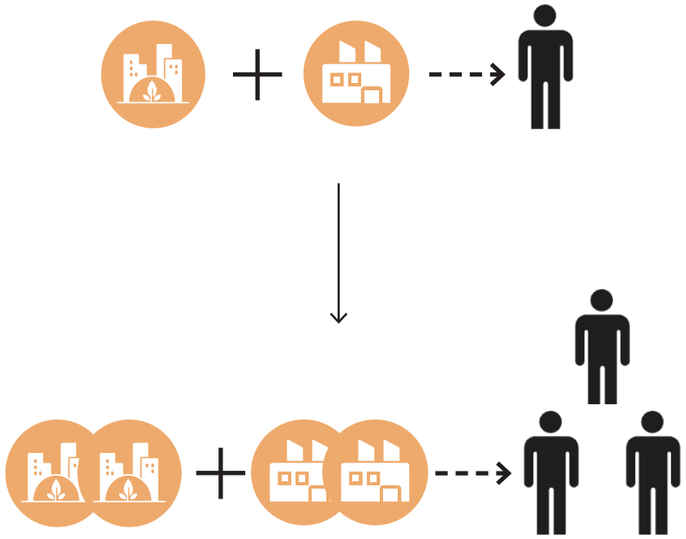
energy flow

6.5 TIMELINE

Vision



6.5 TIMELINE



"By 2035, the city aims to improve living standards, enhance social resilience and equality, and elevate public service levels. Community services, including education, healthcare, culture, sports, and elderly care, will achieve **full coverage within a 15-minute walking distance**", from Suihua Municipal People's Government.

The timeline for Suihua's urban shrinkage plan follows a clear implementation logic, first adhering to the municipal government's 2035 development vision of achieving "15-minute neighborhood circle full coverage."(Suihua Municipal People's Government, 2024). To accomplish this goal, the plan prioritizes improving spatial efficiency by focusing on upgrading public service spaces and community facility configurations.

In terms of specific implementation strategies, we follow the "light renovation first" principle by front-loading projects requiring less earthwork. For example, in the "Urban Living Room" typology plan, we first utilize vacant land to construct phase one plazas, while postponing more intensive earthwork projects like demolition, renovation, and reconstruction. This phased approach is similarly reflected in the "Super Community" construction.

Another crucial consideration in this planning logic is the coordination between population attraction and industrial cultivation. As mentioned on page 12 of the report, we need to encourage migration of surrounding rural populations to Suihua's central district. To achieve this, we must first enhance the city's attractiveness by establishing two fundamental support systems: 1) a comprehensive housing security system, and 2) sufficient employment opportunities. Only by first addressing migrants' housing, service and income needs can we effectively increase rural residents' willingness to relocate.

The timeline follows a progressive logic:

1. Initial phase: Urban environment and infrastructure improvements;

2. Parallel action: Industrial upgrading and economic development;

3. Staged population intake: Gradual migration aligned with the city's evolving carrying capacity.

As industries expand and urban construction matures, the city will systematically increase its population absorption capacity. The ultimate goal is to help remaining rural residents achieve income parity with urban residents through scaled operations (≥200 mu per capita, see page 11), fulfilling both equity objectives and agricultural modernization requirements. The plan embodies a systematic progression from environmental transformation to economic growth, culminating in demographic restructuring.

07 Strategy

Figure 68: Farmland in Suihua, bundled straw ready for burning
Photographs by author

7.1 MASTER PLAN

Legend

- Industry
- Residence
- Farmland
- Village
- Farmland
- Park
- Urban Farm
- Migrants Flow
- Production Material Flow
- Family Farm
- Organic Food Market

Typology 1 Urban Living Room

- Square
- Mall
- City Manufactory (primary agricultural processing/handicraft production)
- BBQ Square

Typology 2 Super Community

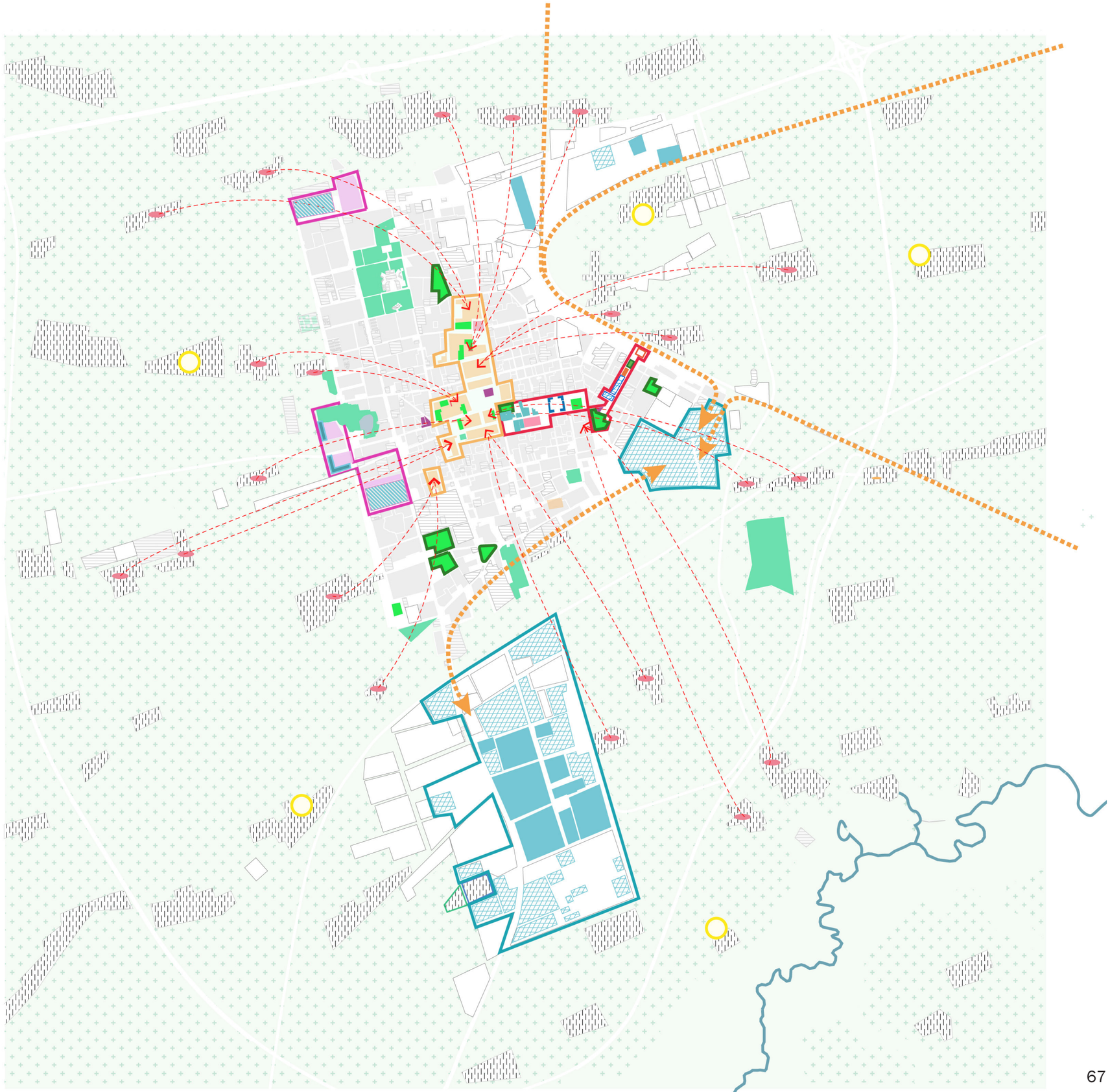
- Super Community
- Community Farm

Typology 3 Modern Creative Industry Park

- E-commerce Industrial Cluster
- Digital Nomad Community
- Co-working Facilities

Typology 4 Agricultural-Industrial Composite Zone

- Exsisting Processing Industry
- New Agricultural-Industry



7.2 DESIGN PRINCIPLE & AND TOOL BOX

PILLARS

Spatial Efficiency

Urban-Rural Economic Growth

Social Cohesion

GOALS

G1.1 Optimize Utilization Efficiency

G1.2 More Open Space and Green Infrastructure

G2.1 Properties Revitalization

G2.2 Industry Upgrading

G3.1 Equitable Welfare

G3.2 Social Bonds in City

DESIGN PRINCIPLE

P1.1 Balance Intensity (demolish)

P1.2 Adaptive Reuse

P1.3 Public service optimisation

P2.1 Mixed Land Use

P2.2 Diversifying the Economy

P2.3 Triple Integration

P3.1 Agricultural Labour Migration Welfare

P3.2 Highly Alternative Investments

P3.3 Satisfaction of Daily Life

STRATEGY

Urban Living Room

SUPER COMMUNITY

Modern Creative Industry Park

Industrial Composite Zone

ACTIONS

A23

A1 Stall

A2 Urban Farm

A3 Affordable Housing

A4 City Manufactory

A5 Flexible Square

A6 Community canteen

A7 Community Center

A8 Co-working Facilities

A9 Digital Nomad Apartment

A10 Training Center

A11 Food Processing Indutry

A12 Folk Cuisine Restaurant

A13 Social Plate

A14 Community Commercial

A15 Walk-way

A16 Library

A17 Livestreaming E-commerce

A18 Organic Food Market

A19 Service Industry

A20 High Value-Added Processing

A21 Logistics Hub

A22 Circuls Economy

7.3 URBAN AGRICULTURAL INDUSTRY MAIN STRUCTURE

Legend

Production

- Unit of Community Supported Agriculture
- Urban Farm
- Community Farm

Processing

- Urban Manufacturing
- Sub-Urban Manufacturing

Sale

- Community canteen
- Community Center
- Organic Food Market
- Restaurant
- Logistic Hub
- Livestreaming E-commerce
- Co-working Facilities
- Service Industry
- Digital Nomad Apartment

Education

- Squre
- Library
- Training Center

7.4 MICRO-SCALE DESIGN TYPOLOGY 1

Identify Sites for Intervention

1. Priority Demolition & Land Reclamation

Characteristics: Structurally sound shopping malls or newly developed residential communities in good condition.
Measures: Preserve as-is with no immediate modifications, focusing on routine maintenance only.

Source: Baidu Streetmap(2015)

2. Adaptive Reuse

Characteristics: Older commercial buildings with declining functionality but potential. **for** revitalization.
Actions: Retention decisions will be based on spatial planning requirements and commercial viability.

Photographs by author

Source: Baidu Streetmap(2015)

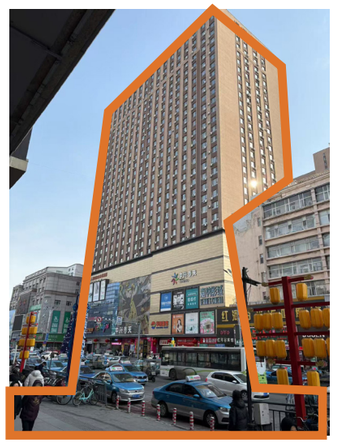
3.Conditional Maintenance or Demolition

Characteristics: Deteriorating housing units that may still serve community needs.
Actions: Evaluate structural integrity—upgrade while retaining original use if sustainable, or clear for redevelopment if obsolete.

Source: Baidu Streetmap(2015)

4. Retention

Characteristics: Structurally sound shopping malls or newly developed residential communities in good condition.
Actions: Preserve as-is with no immediate modifications, focusing on routine maintenance only.

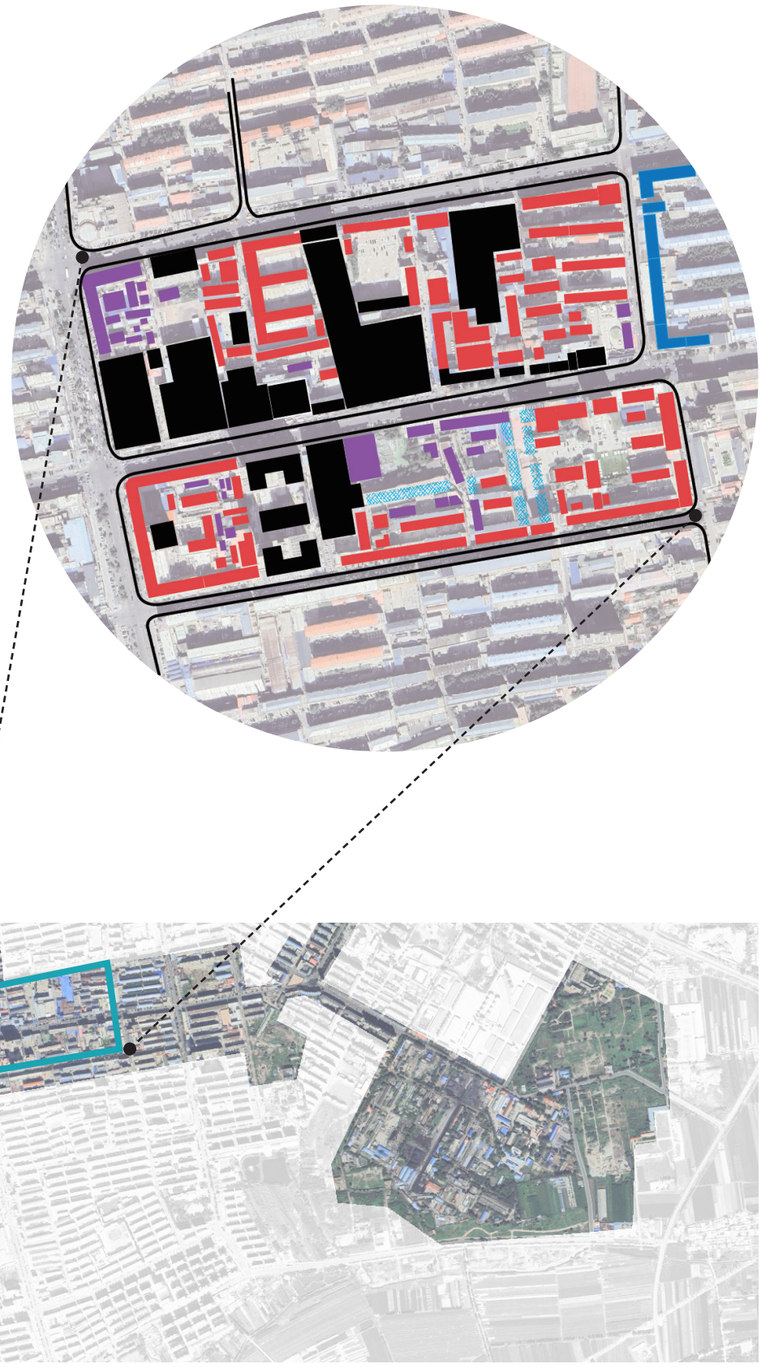


Photographs by author

Intervetion

ZOOM IN

URBAN LIVINGROOM



- Retention
- Demolish
- Mainteinance
- Adaptive Reuse - urban manufactury
- Adaptive Reuse - Folk Cuisine

Based on Google statellite map(2024)
Made by author

A1 Stall

A2 Urban Farm

A4 City Manufactory

A5 Flexible Square

A12 Folk Cuisine Restaurant

A13 Social Plate

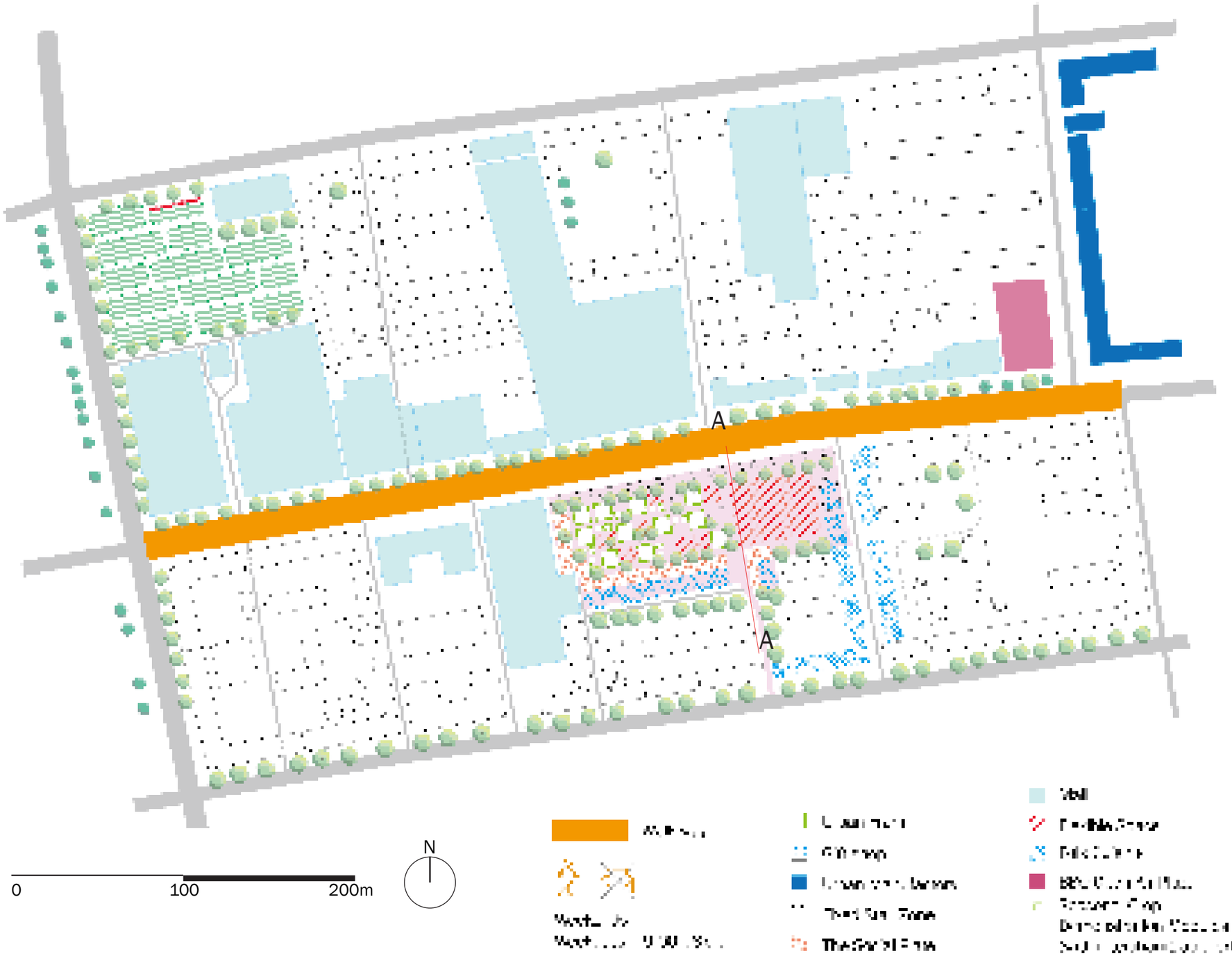
A15 Walk-way

The "Urban Living Room" concept strategically transforms underutilized idle land into an active public plaza through targeted urban interventions. Centered on careful space reclamation, the approach prioritizes demolition of informal structures while preserving and maintaining other existing buildings, ensuring minimal disruption to the established commercial ecosystem. By selectively opening up new public spaces within the dense urban fabric, the design creates a vibrant community hub that maintains the area's existing commercial vitality while introducing much-needed public gathering areas.

7.4 MICRO-SCALE DESIGN TYPOLOGY 1

Strategy

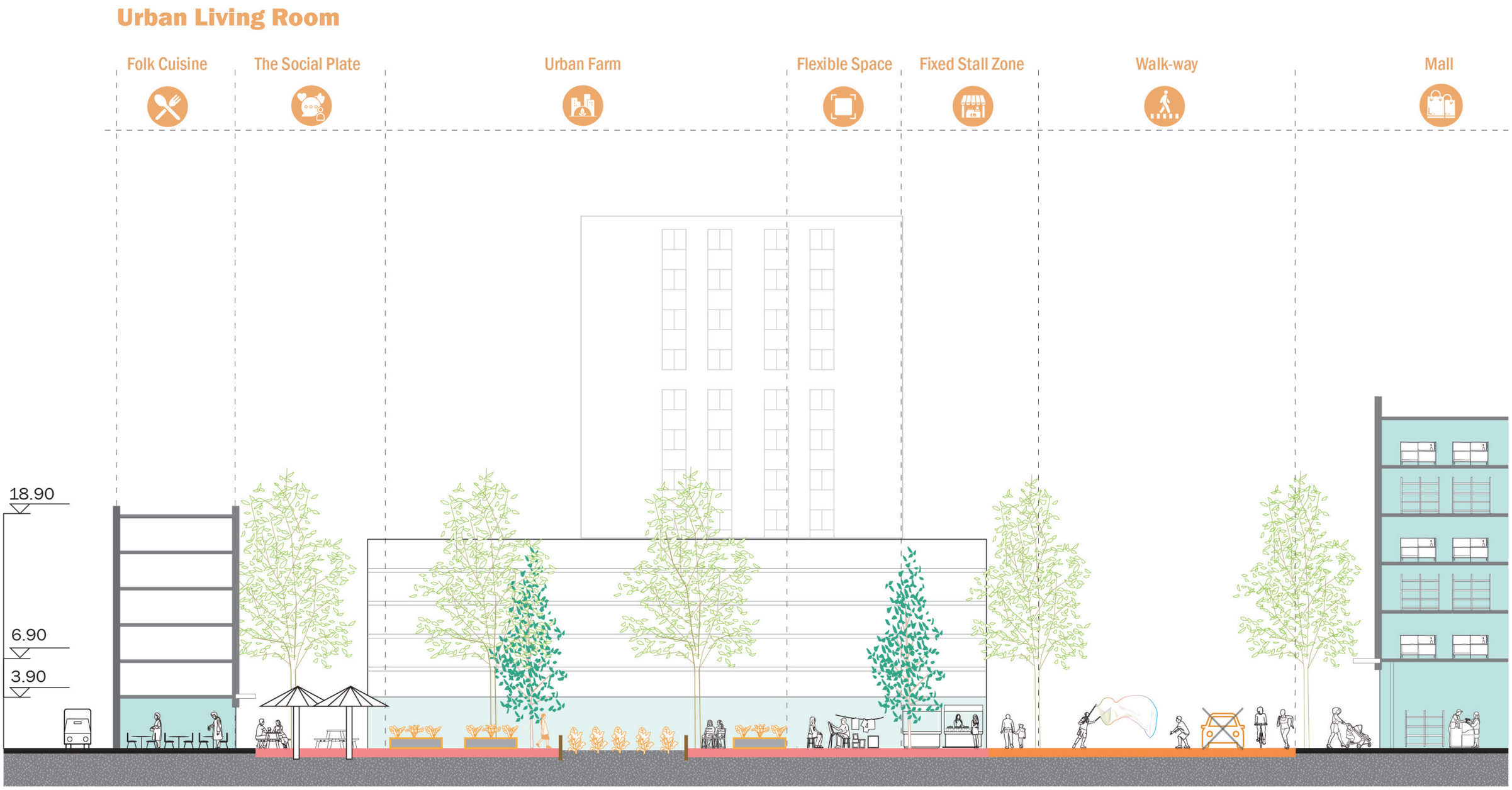
Spatial Design



The fixed stall zone should be strategically located adjacent to high-traffic thoroughfares to capitalize on commercial vitality, preserving the traditional "stroll-and-shop" street vending culture. Social spaces will be intentionally integrated with dining areas to form a synergistic hybrid zone termed "Social Plate," combining food consumption with social interaction. To accommodate the site's diverse activity patterns, the Flexible Square will be designed with generous proportions and deliberate negative space - this intentional spatial vacancy allows for user appropriation and ensures adaptability for spontaneous events, maintaining the potential for multiple concurrent uses.

7.4 MICRO-SCALE DESIGN TYPOLOGY 1

Section A-A

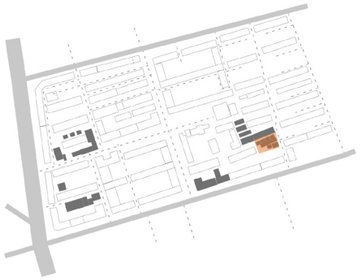


7.5 MICRO-SCALE DESIGN TYPOLOGY 2

Identify Sites for Intervention

1. Priority Demolition & Land Reclamation

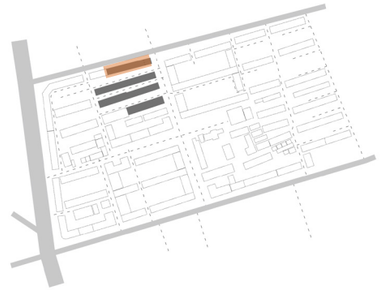
Characteristics: Early-generation, extremely poor-quality informal structures (e.g., urban village self-built homes) lacking legal status or preservation value, with critical safety risks.
Actions: Designate as top-priority demolition targets; repurpose vacated land for public facilities or ecological restoration while relocating residents.



Photographs by author

2. Adaptive Reuse

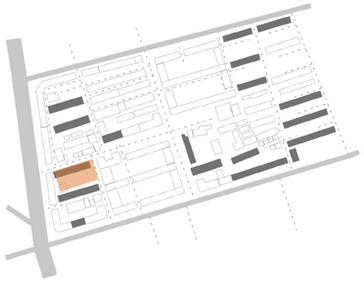
Characteristics: Abandoned buildings with historical, vernacular, or collective memory value, structurally sound but functionally obsolete.
Actions: Selective preservation post-heritage assessment; rehabilitate and repurpose as cultural hubs (e.g., community heritage centers, co-working spaces, or boutique lodgings).



Source: Baidu Streetmap(2015)

3.Conditional Maintenance or Demolition

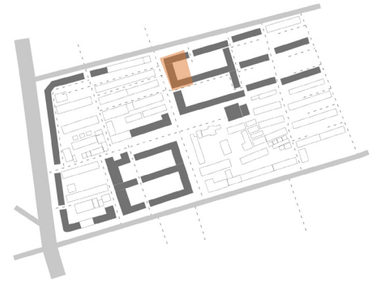
Characteristics: Mid-aged structures (non-earliest generation) with moderate conditions but functionally viable.
Actions: Decisions will be made based on functional value and maintenance costs. Buildings with high economic value or low renovation costs will be prioritized for refurbishment, while those with low value and low maintenance costs may be demolished for land repurposing.



Source: Baidu Streetmap(2015)

4. Retention

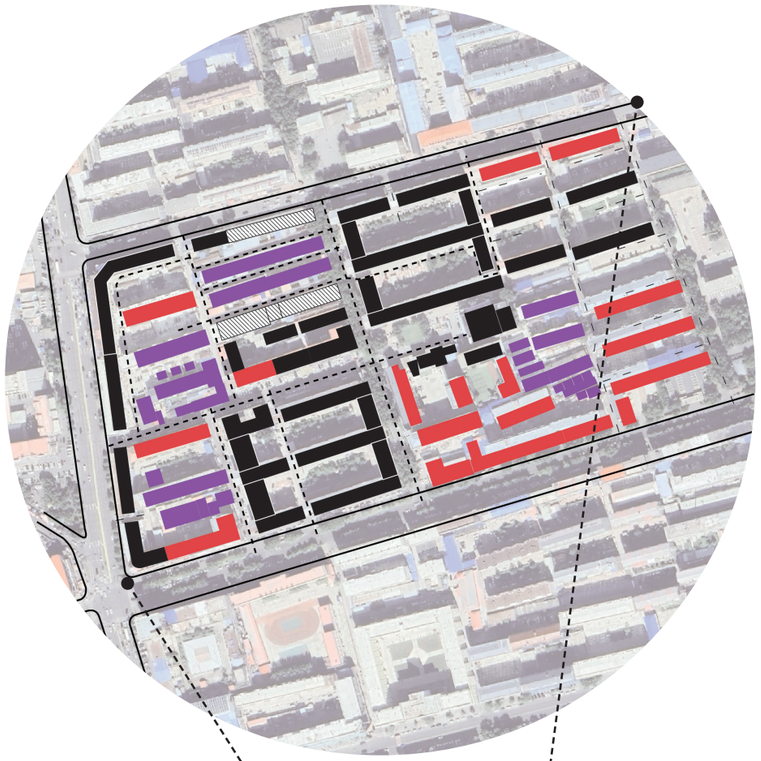
Characteristics: Recently built, structurally sound buildings compliant with current standards.
Actions: These buildings will be fully retained and systematically cataloged in the urban housing stock system, creating a sustainable pipeline for affordable housing provision.



Source: Baidu Streetmap(2015)

7.5 MICRO-SCALE DESIGN TYPOLOGY 2

Intervetion



ZOOM IN

SUPER COMMUNITY

- Retention
- Demolish
- Mainteinance
- Adaptive Reuse

Based on Google statellite map(2024)
Made by author

A2
Urban Farm

A3
Affordable Housing

A4
City Manufactory

A5
Flexible Square

A6
Community canteen

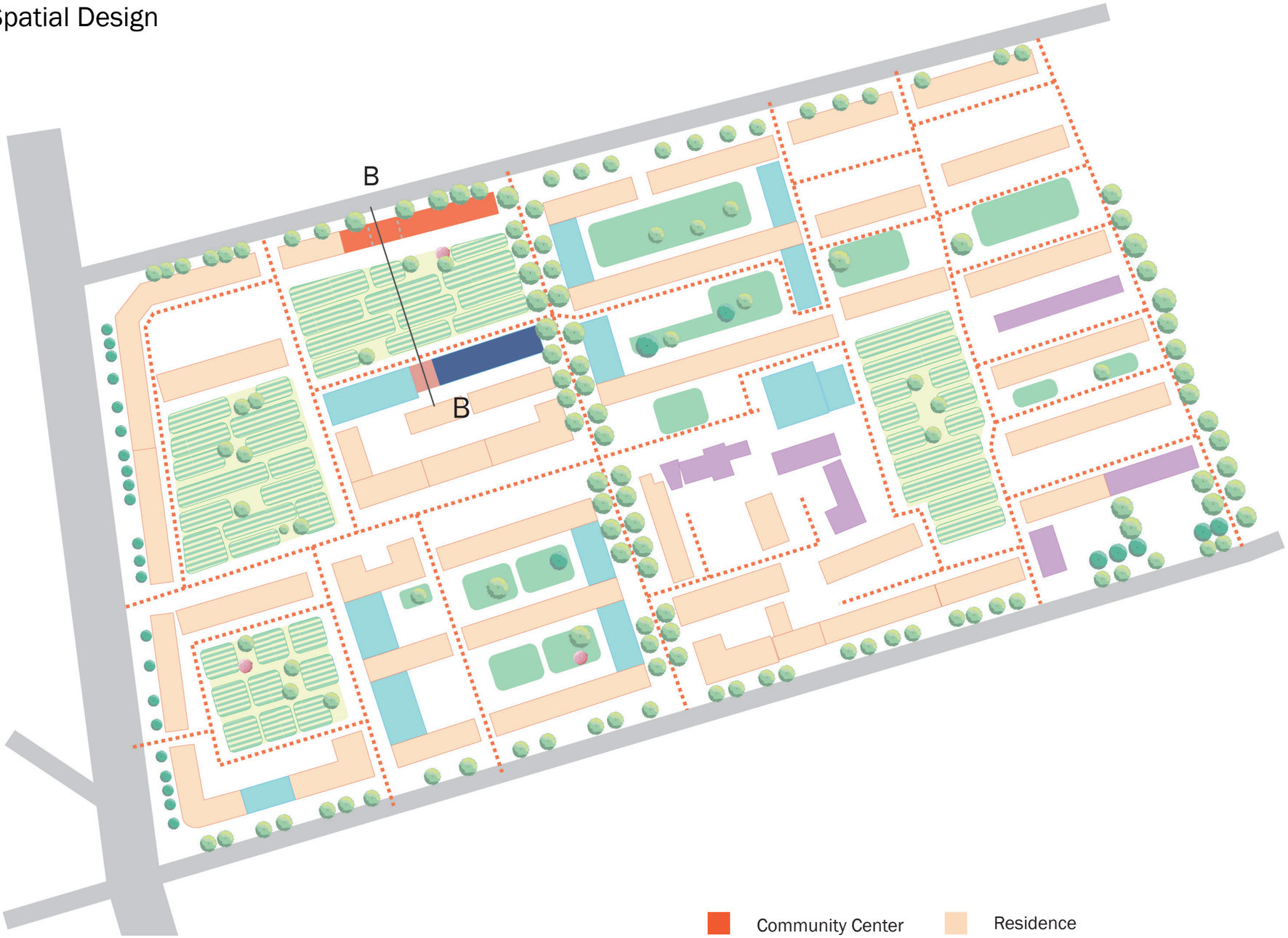
A7
Community Center

A14
Community Commercial

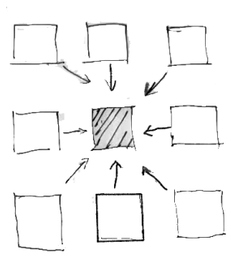
This strategy begins with classifying existing buildings to identify and demolish structurally unsound or obsolete structures with minimal preservation value, while consolidating residents into fewer well-maintained buildings to improve spatial efficiency and reduce infrastructure maintenance costs. The newly liberated spaces will be repurposed into productive community farms and flexible public squares. Meanwhile, structurally sound vacant buildings will be adaptively reused as affordable housing and community service facilities, with particular emphasis on relocating established rural businesses into empty storefronts to maintain familiar neighborhood commercial networks and preserve the area's social fabric.

7.5 MICRO-SCALE DESIGN TYPOLOGY 2

Spatial Design



The community farm, functioning as the community's vibrant heart, is encircled by communal dining halls, relocated local businesses, and affordable housing - collectively forging a strong sense of place and neighborhood identity. This intentional spatial configuration not only optimizes land-use efficiency but, more significantly, generates abundant opportunities for spontaneous encounters and social interaction, serving as a vital platform for fostering connections between longstanding residents and newcomers.



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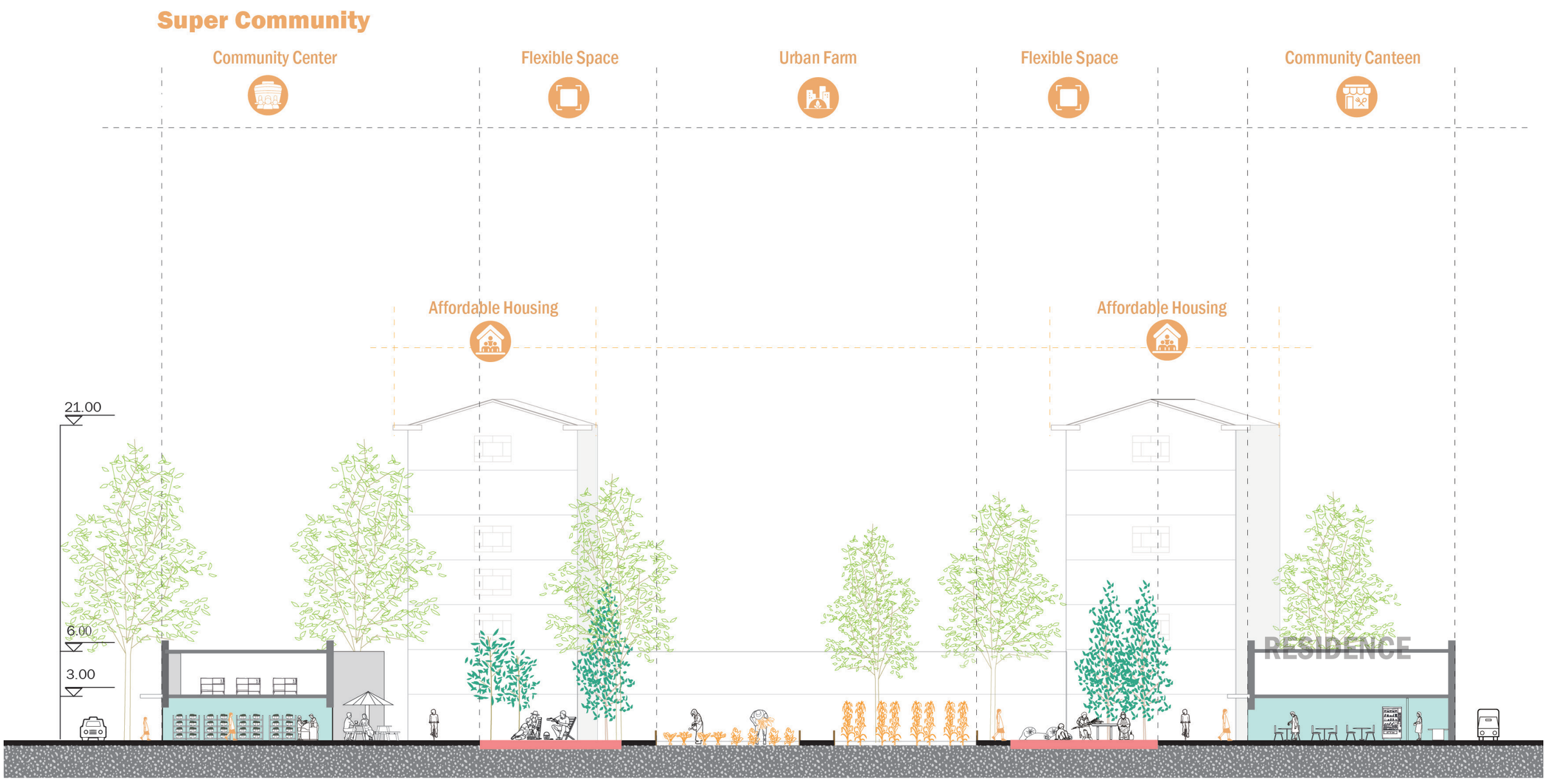
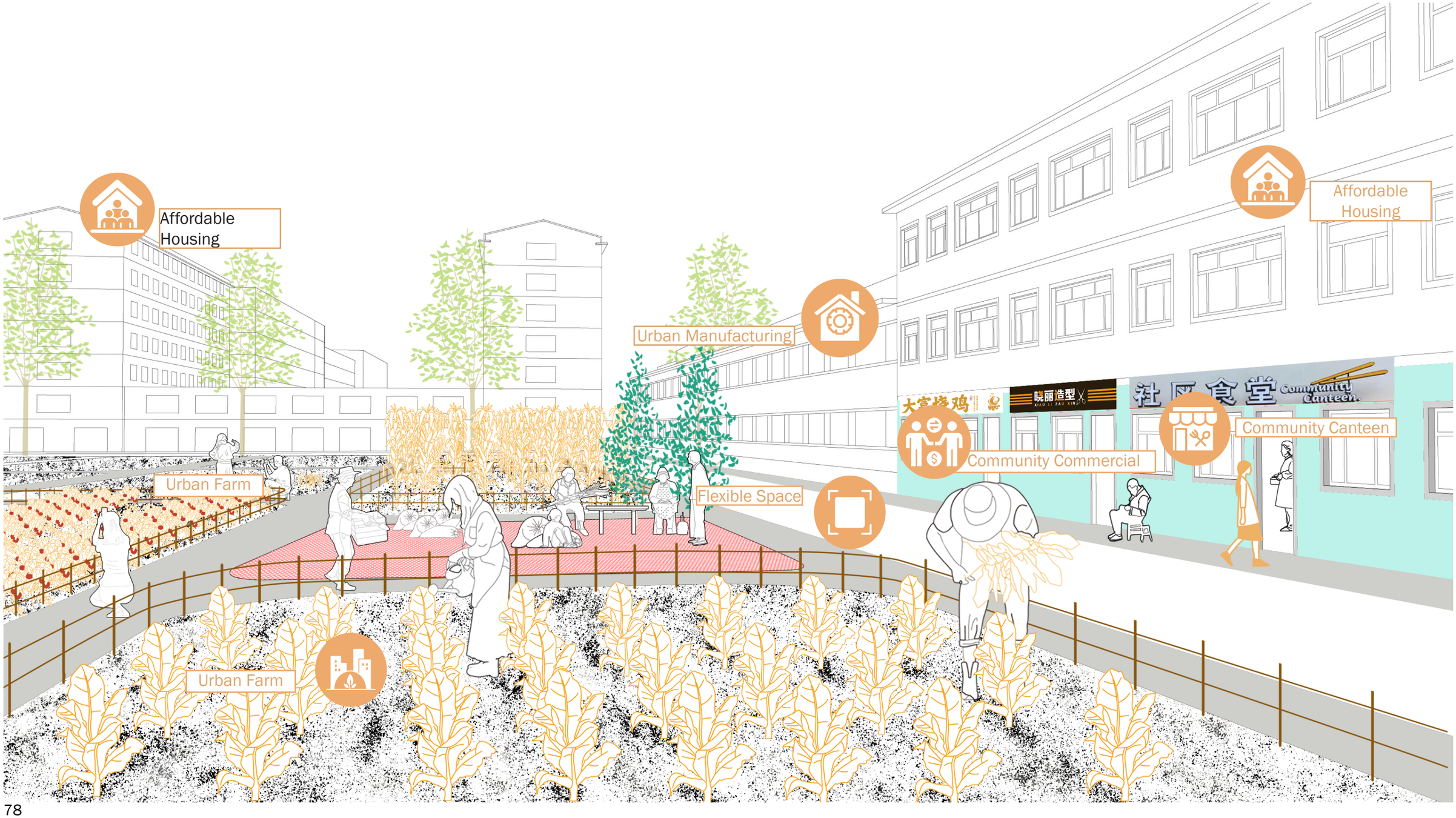
7.5 MICRO-SCALE DESIGN TYPOLOGY 2

Section B-B

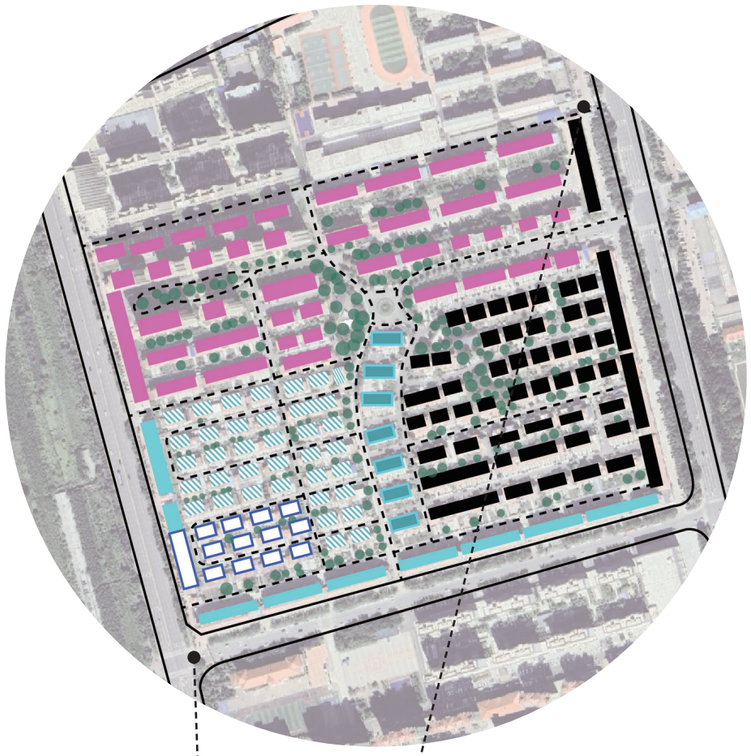


7.5 MICRO-SCALE DESIGN TYPOLOGY 2



7.6 MICRO-SCALE DESIGN TYPOLOGY 3

Intervention



ZOOM IN

MODERN CREATIVE INDUSTRY PARK

- Retention
- Adaptive Reuse - Co-working Facilities
- Adaptive Reuse - Service Industry
- Adaptive Reuse - Digital Nomad Apartment
- Adaptive Reuse - Logistics Hub
- Adaptive Reuse - Livestreaming E-commerce

A8 Co-working Facilities

A9 Digital Nomad Apartment

A17 Livestreaming E-commerce

A19 Service Industry

A21 Logistics Hub

Based on field surveys, some communities within the area exhibit vacancy rates exceeding 85%. Leveraging the advantages of existing buildings, this plan adheres to the principle of "Adaptive Reuse" to avoid large-scale demolition. The abundant vacant villas are particularly suitable for conversion into creative studios, sharing working space and exhibition-style warehousing spaces to accommodate e-commerce livestreaming operations—an immensely popular online shopping format in contemporary China (Qu, 2021). Meanwhile, high-rise residential buildings will be adaptively transformed into digital nomad apartments.

Based on Google statellite map(2024)
Made by author

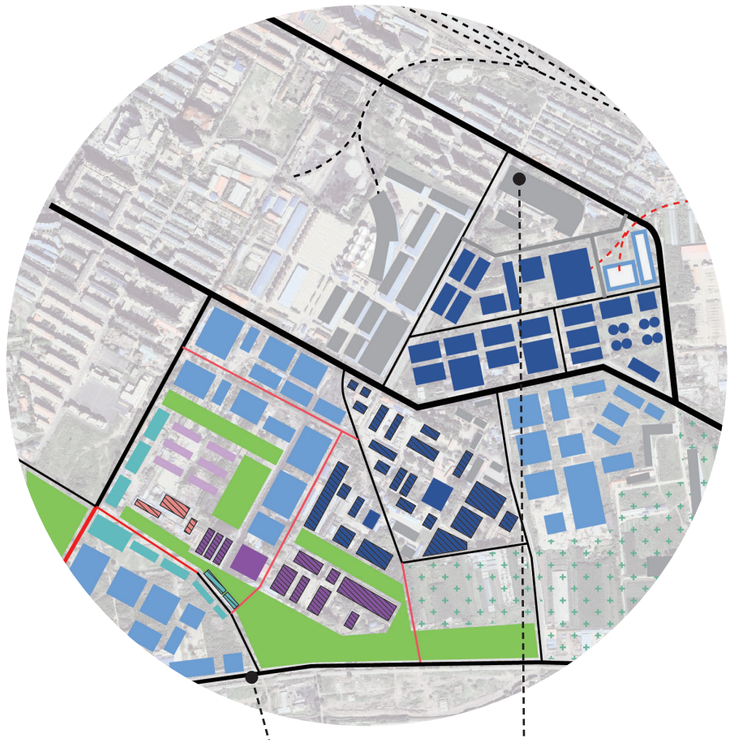
7.7 MICRO-SCALE DESIGN TYPOLOGY 4

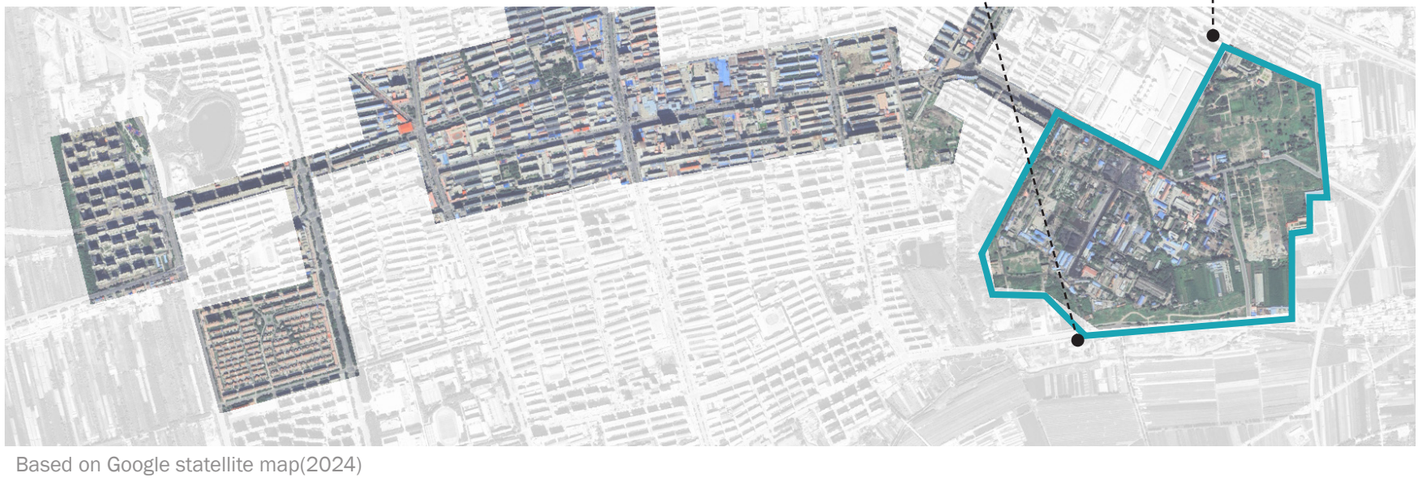
Intervention

ZOOM IN

AGRICULTURAL-INDUSTRIAL COMPOSITE ZONE

- Exsisting Factory
- Adaptive Reuse
- Logistic Hub
- Food Processing
- High Value-Added Processing
- Agricutural Circular Industry
- Training Center
- Transitional Housing
- Commercial
- Farmland
- Greenland
- New Road
- New Railway





Based on Google statellite map(2024)
Made by author

A11 Food Processing Indutry

A10 Training Center

A3 Affordable Housing

A20 High Value-Added Processing

A21 Logistics Hub

A22 Circular Economy

Economic underdevelopment constitutes the primary driver of rapid population outmigration, making industrial upgrading imperative. The Agricultural-Industrial Composite Zone will catalyze value chain diversification through: (1) advanced agro-processing industries: Food Processing Industry and High Value-Added Processing Industry like pharmaceuticals, and biotech sectors (see Appendix 1 for industrial matrix), (2) Agricutural Circular Economy systems utilizing crop residue (primarily straw) to eliminate open burning pollution, and (3) a railway-adjacent Logistics Hub optimizing regional distribution. (4)Integrated workforce development facilities (vocational Training Center and Transitional Housing) will ensure equitable labor market participation during structural transformation.

08 CONCLUSION

8.1 ANSER TO RESEARCH QUESTIONS

SQ1 What are the factors that have caused shrinking population and how these are likely to change with respect to the ongoing trends?

Suihua's demographic contraction problem stems from dual structural factors: on the one hand, the demographic structure itself has negative growth inertia and a low birth rate, creating a demographic decline momentum that is difficult to reverse; on the other hand, as an important agricultural production base under the national food security strategy, the agriculture-led mono-industrial structure severely constrains economic development, putting it at a disadvantage in national On the other hand, as an important agricultural production base under the national food security strategy, the agriculture-led mono-industrial structure severely restricts economic development and puts it at a disadvantage in the national urban competition. This economic disparity has contributed to the continued outflow of labor to economically developed regions.

SQ2 What is the extent and the social, spatial, economic (etc.) impacts of shrinkage?

Social Impacts:
Suihua has seen the emergence of concentrated poverty, with the income gap between its residents and the national average widening significantly.

Spatial and economic mpacts:
Severe population loss has led to a rapid increase in vacant properties, substantially raising government costs for infrastructure maintenance. Given Suihua's already weak economic base, this outmigration further exacerbates economic decline, accelerating urban spatial decay.

SQ3 What policies and spatial strategies are used or can be implemented to address urban shrinkage so that mitigate the pace of population loss?

To effectively mitigate urban shrinkage and slow population loss, cities like Suihua should adopt a dual approach combining spatial restructuring and economic transformation. Spatially, the strategy should focus on proactive urban contraction—selectively demolishing structurally unsound or functionally obsolete buildings to reduce maintenance burdens while repurposing vacated land for green infrastructure or community amenities that enhance livability. This spatial rationalization must be paired with aggressive industrial upgrading, particularly in agriculture-dominated regions. By developing integrated "agriculture-plus" value chains—such as combining crop production with food processing, agritourism, and cold-chain logistics—cities can create higher-wage jobs and retain younger populations.

Critically, these interventions require synchronized policy support, including subsidies for agricultural cooperatives, tax incentives for agro-industries, and housing programs that make repopulated neighborhoods attractive to skilled workers.

SQ4 What opportunities exist while mitigate the shrinkage of suihua?

Urban shrinkage presents a unique opportunity for Suihua to recalibrate its urban spatial structure. As a city that rapidly developed into a high-density urban area post-industrialization, population decline now allows for strategic rebalancing of spatial density. This natural contraction enables more efficient land use, creating room to transform outdated urban configurations into better-organized, more sustainable spaces. By thoughtfully redistributing remaining populations and functions, Suihau can optimize infrastructure investments while improving overall living conditions within a more appropriately scaled urban framework.

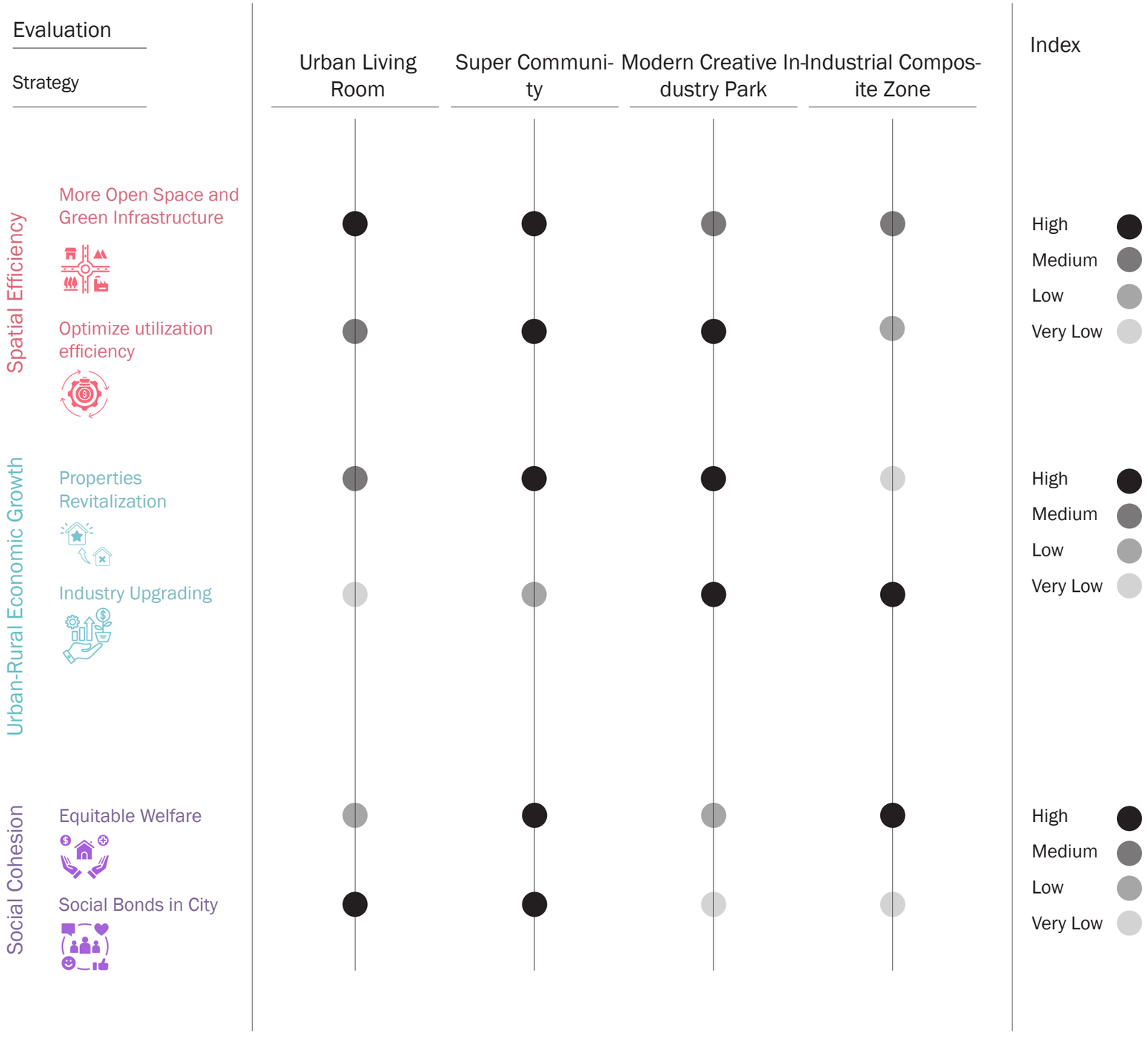
8.1 ANSWER TO RESEARCH QUESTIONS

SQ5 How can proactive shrinkage planning create a compact and livable environment for its future remaining residents?

The first step is to ensure that spatial planning is retrofitted in existing cities and that there is no outward expansion. By strategically concentrating populations and services, the city can redirect limited resources toward less neighborhoods, ensuring efficient infrastructure maintenance and higher-quality public amenities within walkable distances. This "15-minute city" approach reduces sprawl while improving access to schools, clinics, and green spaces for remaining communities.

SQ6 Can there be a synergy between exploiting new land/building-reuse opportunities and supporting shrinking regions?

Yes. By bringing the agricultural industry into the city, there is a greater variety of functions within the city. Abandoned vacant lots or demolished buildings are converted into urban farms. Developing community-supported agriculture (CSA) in hollowed out neighborhoods. As well as the creation of e-commerce industrial parks to realize direct marketing of products to serve local agriculture.



Through analysis, it has been confirmed that the primary cause of Suihua's urban decline stems from a vicious cycle of economic recession leading to deteriorating public spaces and population outflow (as identified by SWOT factors W3/T2). Conventional single-dimensional urban renewal models fail to break this cycle, necessitating the integration of both social and economic functions (e.g., community farms) to reactivate spatial value while leveraging agricultural advantages to reignite urban vitality.

At the spatial efficient level, the Super Community strategy effectively addresses the dual challenges of high maintenance costs and low utilization rates of vacant properties, while mitigating continued urban decay.

At the economic growth level, the Modern Creative Industry Park and Industrial Composite Zone strategies help Suihua overcome the limitations of its agriculture-dependent economic structure.

At the social cohesion level, the Urban Living Room and Super Community create shared spaces and community farms that serve as platforms for interaction between established residents and newcomers, fostering a sense of community identity. Furthermore, the Super Community and Industrial Composite Zone strategies specifically safeguard vulnerable groups—particularly rural migrants—by ensuring their access to urban housing and stable economic livelihoods.

Key factors requiring further verification include:

Actual participation rates in urban agriculture among both rural migrants and urban residents;

Management feasibility for Super Communities, digital nomad housing, and other shared facilities;

Government commitment to funding spatial reorganization, long-term operational support, and industrial upgrading;

Representative statistical data on relocation willingness among urban and rural populations.

8.3 REFLECTION

8.3.1 Scientific Relevence

The scientific relevance of my project lies in:

1. Utilization of geographic information system (GIS) data, demographic statistics, and economic indicators sourced from government databases and academic research to analyze spatial patterns and population dynamics associated with urban shrinkage. By examining vacancy rates, land use changes, and population outflows, the project leverages these objective data sources to inform strategic planning for urban shrinkage, while creatively constructing a "Shrinkage Diagnostic and Identification System" tailored to Suihua, providing scientific decision-making support for differentiated shrinkage governance.

2. Theoretical Framework Innovation:
This project develops a cross-scale smart shrinkage conceptual framework integrating spatial restructuring, economic development, and social cohesion, effectively addressing common post-shrinkage socio-economic imbalances (Rhodes & Russo, 2013).

3. Current Research Gaps:
Limited adaptive planning models: Most urban planning models remain growth-oriented, with insufficient research on adaptive frameworks specifically designed to manage urban shrinkage and decline.

Insufficient case studies and comparative analyses: While some case studies exist, particularly in Europe and the United States, there is a lack of comparative research across different cultural, economic, and geographic contexts—especially in developing countries or regions with unique urbanization patterns (Long et al., 2015).

This study focuses on the theory and practice of shrinkage governance in small, agriculturally distinctive cities on China's periphery, providing the first localized solution framework for medium and small cities like Suihua that face complete shrinkage while being marginalized regionally (Chen et al., 2024). Specifically, by constructing a triple-coupled "spatial-economic-social" shrinkage response mechanism, this research achieves three groundbreaking contributions: Establishes a shrinkage spatial optimization model based on adaptive reuse principles; Develops an economic revitalization pathway oriented toward agricultural industrial chain extension; Innovates a social stabilization strategy rooted in rural cultural identity. These practices provide a replicable governance paradigm for regions with similar developmental backgrounds.

8.3.2 Social Relevence

The social relevance of my project lies in

1. Addressing the multifaceted challenges that come with urban shrinkage, a structural issue impacting various regions worldwide, including Suihua. Shrinking cities often represent areas with limited livability and economic stability, making it essential to prioritize the needs of these communities on local, national, and even international agendas. By focusing on the needs of Suihua’s residents, my project advocates for inclusive planning strategies that aim to improve quality of life.

2. Moreover, the vacant land resulting from shrinkage presents valuable opportunities for exploring innovative, sustainable land uses. Repurposing this space for green infrastructure, community areas, and other non-traditional uses not only enhances the livability of shrinking areas but also contributes to sustainable development goals, which are of broad societal relevance. Creating planning principles and design tools that enable these transformations is essential for ensuring the social, ecological, and economic resilience of Suihua in the long term.

8.3.3 Ethical Relevence

The project addresses urban shrinkage in Suihua through collaborative design and planning measures, involving sensitive issues such as land and housing ownership and potential relocation. Ethical considerations are essential to ensure that planning strategies are inclusive, transparent, and prioritize the rights and well-being of local residents.
Property Rights and Relocation Sensitivity: The planning measures of this project involve considerations of land and housing ownership, requiring careful attention to property rights. Ethical planning should respect existing ownership structures and provide fair compensation or alternatives in cases where relocation is necessary. Measures must be taken to prevent any unjust displacement and to ensure that property owners actively participate in the planning process.
Prioritizing Community Well-being: The main goal of this project is to enhance resilience and sustainable development for Suihua's residents. Therefore, all planning measures should be assessed to ensure they contribute positively to local well-being, avoiding any actions that could lead to social exclusion or gentrification. Instead, the focus should be on inclusive, adaptive strategies that empower the community and improve quality of life in the context of urban shrinkage.
These ethical principles guide the project toward fair and sustainable planning practices that support the community's needs and respect individual rights in the process of managing urban shrinkage.

8.3.4 Reflection and Acknowledgement

After P2, I take part in another intensive course-The Pattern Language, it helps a lot in shaping my design principles and provide many ideas for building the strategy tool box, though I regret not having the opportunity to develop my own pattern field fully.

A key limitation emerged during site research—without a predetermined study area, I relied heavily on satellite imagery and outdated 2015 street views, occasionally supplementing with fragmented social media findings. This constraint highlighted the importance of establishing clear geographic parameters early in the research phase.

The most challenging, however, was battling severe procrastination. Throughout this project, I struggled with anxiety， It's only when the deadline looms that I can settle down and finish the task. After a fortuitous attempt at preparing a P4 report, I recognized the value of structured task lists: breaking projects into concrete, checkable items provided both direction and motivation. This rediscovery led to an important epiphany: action precedes inspiration. By simply starting—sketching imperfect ideas or drafting rough sections—I found momentum building organically.

I would like to express my deepest gratitude to my supervisor, Marcin, for his invaluable guidance throughout this project. Marcin's profound knowledge has significantly enriched my academic understanding, and his systematic and rigorous logical thinking has provided immense assistance—particularly in an area where I have long struggled and often been tempted to overlook. Under his mentorship, I have repeatedly confronted this weakness and continuously refined the logical coherence and structural integrity of my project. While I dare not claim that my work is now flawlessly logical or perfectly structured, the progress I have made in this regard is undeniable and substantial.

I am also immensely grateful to my supervisor, Claudio. Coming from an undergraduate background in architectural design, I frequently found myself trapped in excessively small-scale thinking and struggled to grasp the broader urban framework. Claudio patiently guided me through these challenges, and I sincerely appreciate his support in enhancing the visualization of my research.

Lastly, I extend my heartfelt thanks to my friends, Lin Xinyu and Wang Haochen, for their companionship, academic support, and stimulating discussions throughout this journey.

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APPENDIX

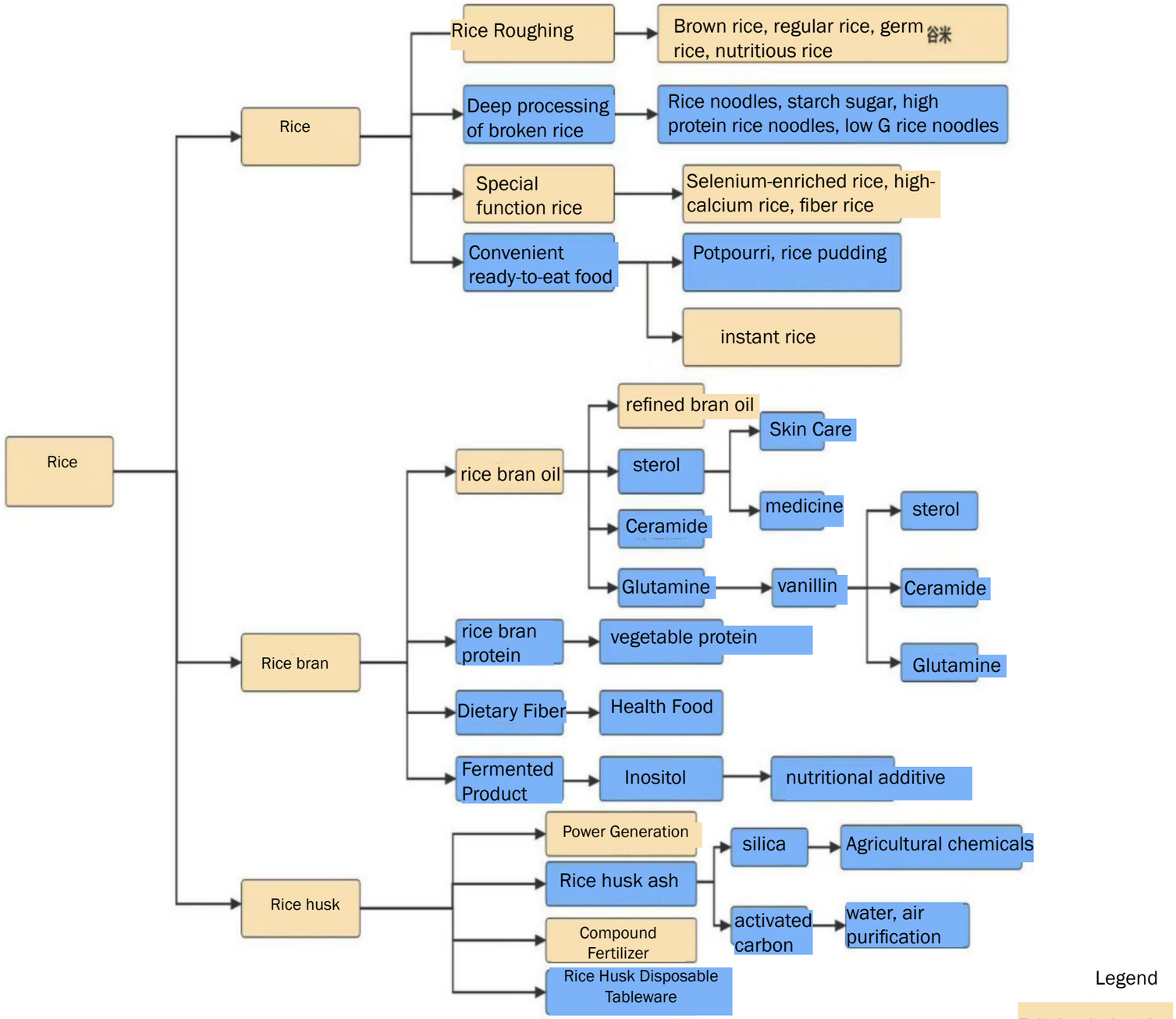


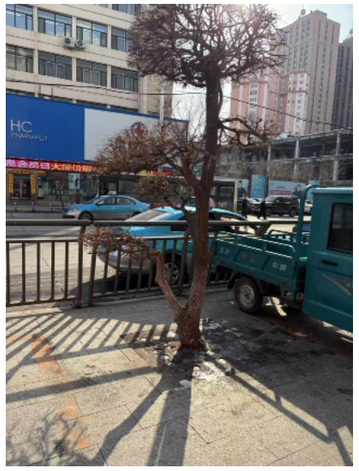
Figure : Rice Processing Industry Matrix

（Soure:Suihua Municipal People's Government，2023）

Besides, Suihua Municipal People's Governmen also demonstrate Soybean Processing Industry Matrix, Dairy Products Processing Industry Matrix, Meat Products Processing Industry Matrix, Corn Bio-fermentation Industry Matrix, Chemical Industry Matrix, Pharmaceutical Manufacturing Industry Matrix, Hemp Textile Industry Matrix, Recycling Industry Matrix. For details, please refer to the "Notice of Suihua Municipal People's Government on Issuing the Development Plan for Suihua's Modern Industrial System (2023-2026)" (Suihua Municipal People's Government，2023).

APPENDIX

Field trip outcomes of Typology 1



All pictures photographs by author

Pedestrian walkways are being occupied in various ways, disrupting the continuity of the streets. Pedestrians and motor vehicles are forced to share the same space.
(interview)

In front of the shopping mall, the pedestrian walkway is shared for multiple uses, including sports facilities and vendors. Alongside the street, there are inexpensively operated, illegally parked private vehicles.

The land has been empty for many years. There is very little greenery in the area.

APPENDIX

Field trip outcomes of Typology 2

The former government office facilities have been relocated, leaving behind vacant properties. Some of these have been repurposed and transformed into kindergartens.

The government office buildings and spaces that remain in a state of abandonment occupy prime locations, yet they mar the urban landscape with their derelict presence.

Residential areas in the city center lack greenery. Some have been upgraded with improved infrastructure but still lack public activity spaces. Many areas remain unrenovated, with cluttered and crowded environments.

There lies an abandoned urban village, a relic of the past nestled within the bustling city. The owner of one of these dwellings expressed a strong desire to sell the aged and dilapidated houses, having repeatedly petitioned the government for their demolition and redevelopment.

All pictures photographs by author

APPENDIX

Field trip outcomes of Typology 3

The Suihua government aims to develop this area, relocating public facilities here. Parks, squares, and museums are built, and market events are held to attract visitors.

The southwestern portion of this area is also newly developed, featuring wide streets, high-quality facilities, and relatively new buildings. It remains active in the real estate market.

All pictures photographs by author

There is an urban grassland tightly enclosed by corrugated iron sheets. Once a plantation, it now features abandoned greenhouses and scattered shanties along its edges.

APPENDIX

Field trip outcomes of Typology 4

Many industry plants has been abandoned.

To the west lie the factory buildings, while to the east stretches an expanse of abandoned waste-land, untended and devoid of cultivation.

An activity center has been constructed, featuring a light and shadow theme park.

All pictures photographs by author