

Pattern Book

A co-design strategy framework for integrating migrant workers into urban village regeneration



This booklet is part of the outcome of the project 'From arrival city to circular city: the circular development approach to incorporating migrant workers into the urban village regeneration'

Delft University of Technology
Faculty of Architecture and the Built Environment

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Urbanism Track 2023/2024
AR3U013 Methods of Urbanism
AR3U023 Theories of Urbanism
AR3U040 Graduation Orientation

Planning Complex Cities

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Pattern Book
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PATTERN DEVELOPMENT

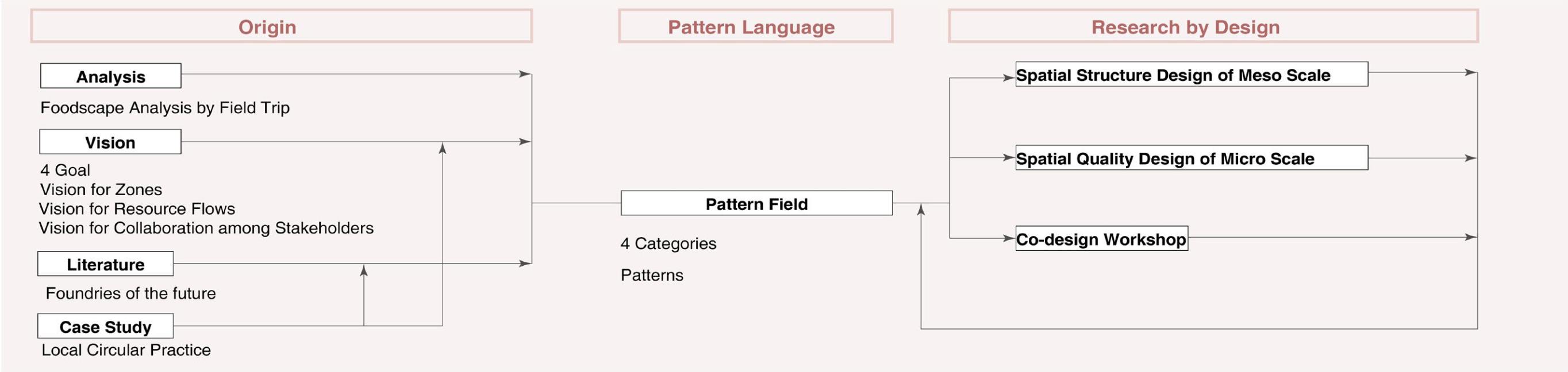


Figure 1: Development flow of patterns

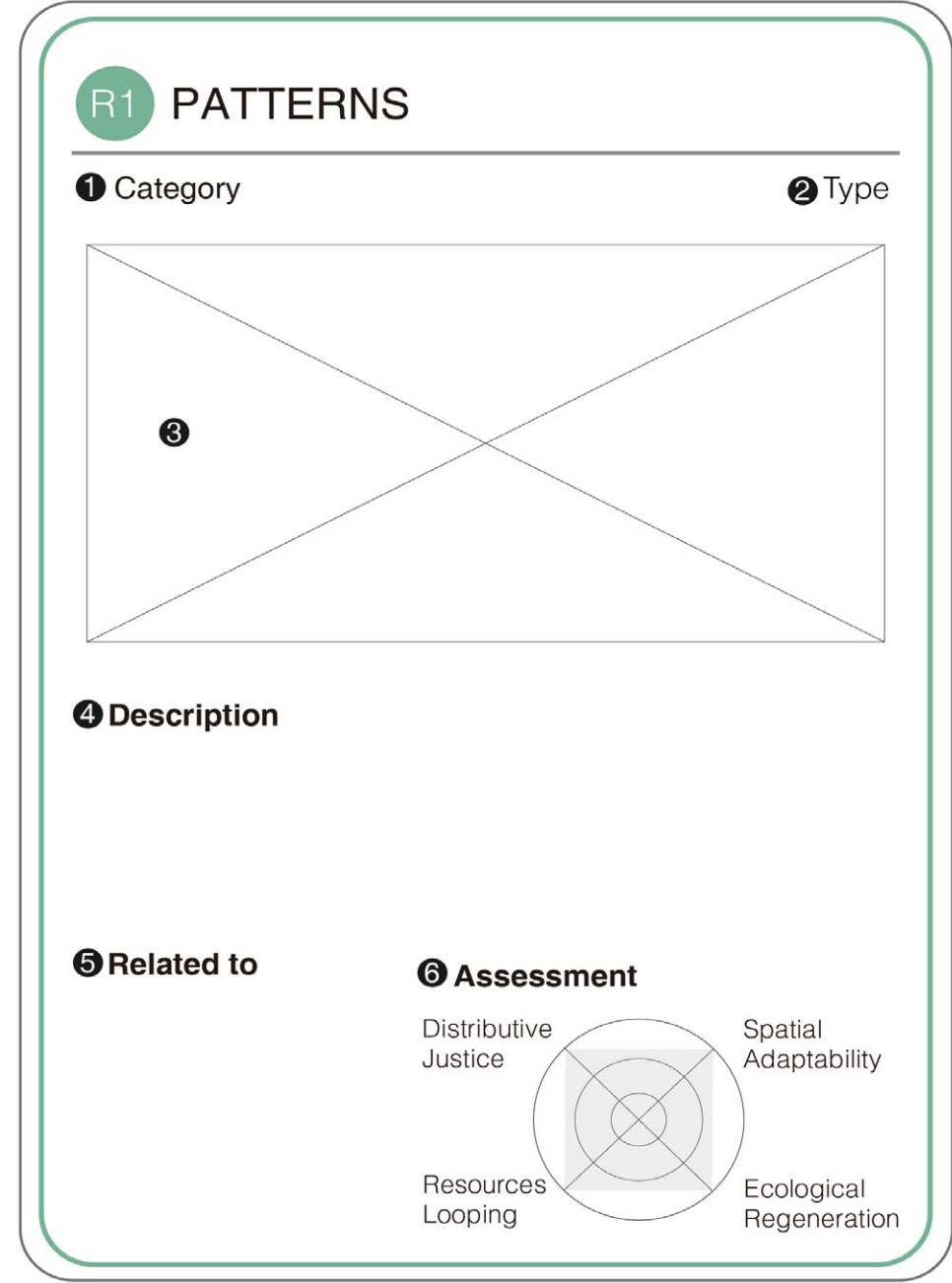


Figure 2: Pattern template

- 1 4 Categories of patterns
(R=Resources Looping
S=Social Adaption
E=Ecological Regeneration
EO=Equal Opportunities for Development)
- 2 3 Types of patterns
(Urban/Spatial Design
Circular Practice
Policy and people network)
- 3 Case photos of existing circular practices from Chengdu/China
- 4 A concise description of what this pattern represents
- 5 Relation to other patterns
- 6 Circular development assessment of this pattern

To involve marginalized groups, such as migrant workers with limited urban planning knowledge, in the design and decision-making processes, a tool that facilitates co-design and communication is essential. This project uses pattern language as a tool for collaborative creation and communication. This systematic approach breaks down complexity into understandable knowledge blocks and patterns (Croxford et al.).

As illustrated, I have described the process preceding the generation of pattern fields. Essentially, the most critical source of patterns is the Vision, from which patterns are derived by exploring the “What” and “How” of realization. Therefore, patterns are generated under the four goals described in the vision, each corresponding to a category of patterns. Field trips provide insights from the actual sites into the patterns. The meso-scale at which my patterns will be applied covers a large area (12km x 12km). Although I have considered various aspects of the circular transformation systematically, some patterns are inevitably abstract to ensure replicability. However, the purpose of using patterns is to facilitate clear and concise communication with stakeholders from various fields. I referred to the literature, “Foundries of the Future,” adopting some of its patterns and learning its style for naming and describing patterns. This approach aims to ensure that these abstract patterns are understood through direct descriptions and that the anticipated spatial and behavioral changes they will induce are perceptible. Case studies, mostly from Chengdu/China, focus on circular practices and introduce these patterns with intuitive photo examples, confirming their applicability in China. In subsequent design processes and co-design workshops at meso and micro scales, some patterns are added, removed, or modified.

PATTERN FIELD

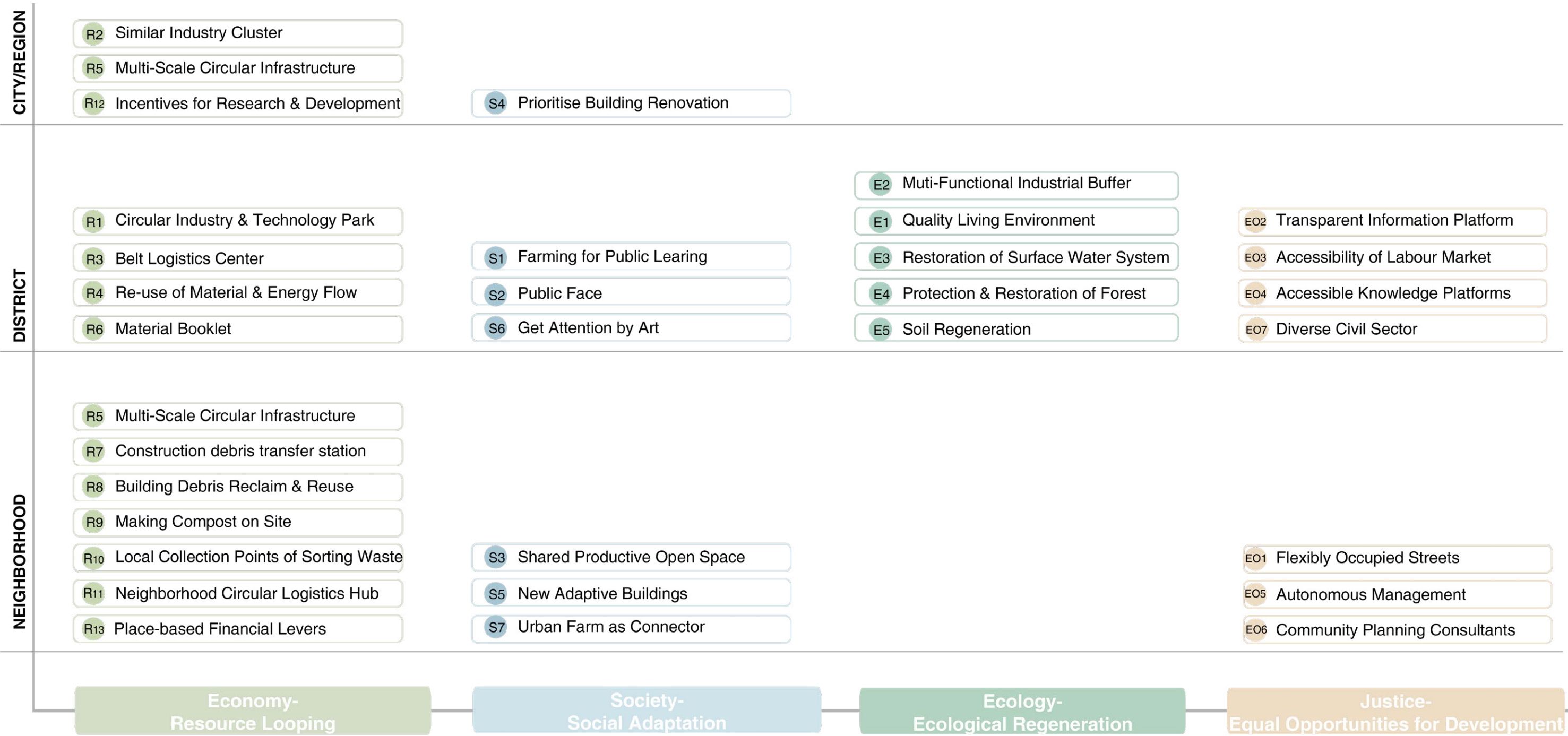


Figure 3: Patterns under the four categories of circular development

Every complex system possesses a hierarchical structure, meaning different processes occur at various scales or levels. There are connections within and between these levels (Wohl, 2018). This is also true for a pattern language. Figure 1 illustrates how the “language” builds a network of connections, where nodes at one level create higher-level nodes (Salingaros, 2000). This process is similarly reflected in my pattern field.

I have developed three higher-level patterns based on four main

objectives. These serve as higher-level nodes that guide the sub-patterns while relying on these sub-patterns for practical application.

The sub-patterns are more focused on the district and neighborhood scale, with interconnected relationships among them. Some patterns require the implementation of a previous pattern to be activated; for example, “Shared Productive Open Space” can only be implemented after “Soil Regeneration” is completed.

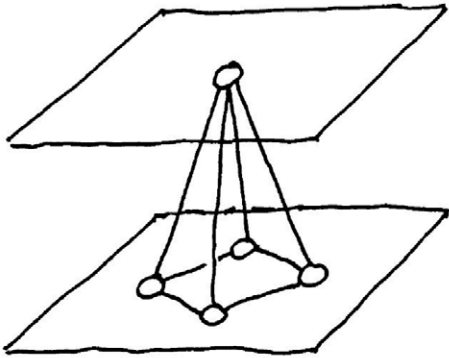


Figure 4: Patterns on one level combine to help define a new pattern on a higher level

PATTERN ASSESSMENT

PATTERN \ CRITERIA		Scale			Location				Origin				Type					Goal	Goal											
		City/Region 	District 	Neighborhood 		Circular Industry Zone 	Circular Consumption Town 	Circular-Life Neighborhood 	Circular Agro Park 		Vision 	Field Trip 	Case Study 	Literature 	Research by Design 		Urban/Spatial design 		Circular Practice 	Policy and people network 	Shortest Resource Loop 	A Closed Balance 	Circular Knowledge Learning 	Adaptable Space 	Farmland Regeneration 	Clean & Rich Water system 	Protection of forest 	Sustainable Labor Markets 	Community Empowerment 	
Circular Industry & Technology Park	R1																			Positive										
	Similar Industry Cluster	R2																												
	Belt Logistics Center	R3																												
	Re-use of Material & Energy Flow	R4																			Neutral									
	Multi-Scale Circular Infrastructure	R5																												
	Material Passports	R6																												
	Space for Storage	R7																		Negative										
	Building Debris Reclaim & Reuse	R8																												
	Making Compost on Site	R9																												
	Local Collection Points of Sorting Waste	R10																		Negative										
	Neighborhood Circular Logistics Hub	R11																												
	Incentives for Research & Development	R12																												
	Place-based Financial Levers	R13																												
Circular Agriculture & Food	S1																		Neutral											
	Public Face	S2																												
	Shared Productive Open Space	S3																												
	Prioritise Building Renovation	S4																												
	New Adaptive Buildings	S5																												
	Get Attention by Art	S6																												
	Urban Farm as Connector	S7																												
Circular Environment	E1																	Neutral												
	Muti-Functional Industrial Buffer	E2																												
	Restoration of Surface Water System	E3																												

R1

CIRCULAR INDUSTRY & TECHNOLOGY PARK

Resources Looping

Circular Practice



Source: Sina_Mobile (2022)

Description

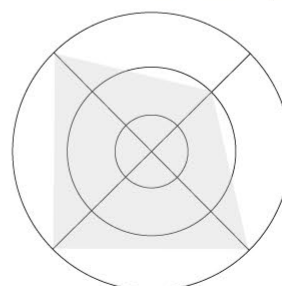
Considering the establishment of appropriately sized food recycling industrial parks within urban areas as pilot projects, especially on the vacant land left after large-scale demolitions in urban villages. These parks should include buffer forests near potentially polluting factories to ensure good environmental quality. Additionally, public exhibition rooms and classrooms should be set up to increase public understanding of waste management.

Relation

R2, R3, R4, R5

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

R2

SIMILAR INDUSTRY CLUSTER

Resources Looping

Circular Practice



Hefeng County in Hubei has opened an organic fertilizer factory in Banzhu Village to process waste from potato, oilseed rape, and camellia planting. This initiative not only forms an agricultural circular flow but also provides employment right at the villagers' doorsteps.

Source: Jimu News(2023)

Description

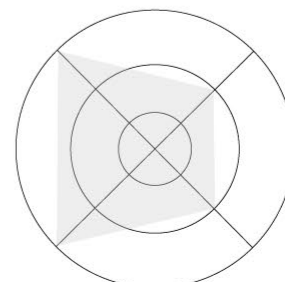
In the Food Recycling Industrial Park, invite clusters of companies involved in crop research, food production, logistics distribution, and waste management to geographically concentrate. This proximity facilitates the sharing of knowledge to close the resource flow loop and encourages interactions within similar markets, attract and cultivate skilled workers, providing employment opportunities closer to the residences of migrant workers.

Relation

R1, R3, R4, R5

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

R3

BELT LOGISTICS CENTER

Resources Looping

Circular Practice



Source: Sichuan Online(2022)

Description

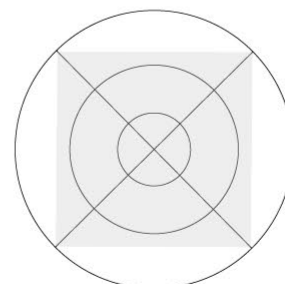
Near large-scale agricultural production and processing areas, such as within a food logistics park, establish a food logistics hub equipped with necessary facilities like cold storage for vegetable preservation. This hub will distribute food directly from greenways to various urban distributors, such as wet markets, promoting a shorter food supply chain.

Relation

R1, R2, R4, R5

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

R4 RE-USE OF MATERIAL & ENERGY FLOW

Resources Looping

Circular Practice



Source: Source: Sina_Mobile (2022)

Description

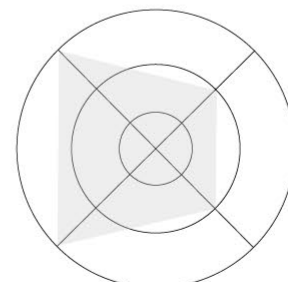
Consider agricultural waste from farming and household waste as local resources. The city needs to formulate policies, and businesses need to create interconnected information platforms and markets to explore the processing methods and locally usable products from this waste, avoiding its export.

Relation

R1, R2, R3

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

R5

MULTI-SCALE CIRCULAR INFRASTRUCTURE

Resources Looping

Circular Practice



Guangzhou Biomass Integrated Treatment Plant, the first comprehensive organic waste treatment project integrating food waste, animal solid waste, fecal waste treatment, biodiesel preparation and biogas power generation

Source: Source: Sina_Mobile (2022)

Description

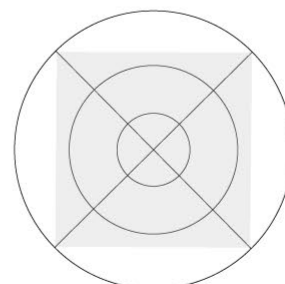
Integrated infrastructure systems at the neighborhood, regional, and city scales to help manage material flows (food, food waste, and construction debris) and promote more efficient reuse of resources.

Relation

R1, R7, R9, R10

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

R6 MATERIAL BOOKLET

Resources Looping

Circular Practice



The 2021 Guidance Manual for Construction Waste Reduction and Resource Utilization in Sichuan Province (Trial) describes recycling options for ten major types of construction waste, including waste concrete and bricks.

Source: Sichuan Provincial Department of Housing and Urban-Rural Development (2021)

Description

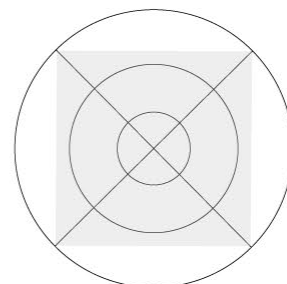
A collaborative booklet developed by architectural firms, construction companies, and migrant workers. It catalogs potential construction debris in urban villages to assess their recyclability and potential reuse options. Additionally, the booklet includes information on innovative recyclable materials made from agricultural waste, such as straw bricks. This helps to simplify the identification and effective use of reusable materials while enhancing understanding of innovative materials.

Relation

R7, R8, S4, S5, S6

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

R7

CONSTRUCTION DEBRIS TRANSFER STATION

Resources Looping

Urban/Spatial Design
Circular Practice

A construction waste sorting facility built on a demolition site, Shanghai

Source: The Paper (2016)

Description

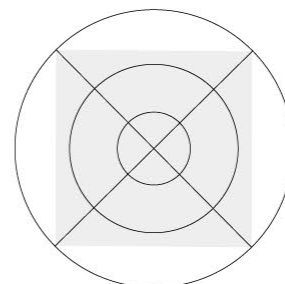
Local community spaces are crucial for the onsite reuse of building debris, allowing for temporary storage and preliminary sorting of materials. Highly reusable items, such as glass and windows, are likely to be swiftly collected by local second-hand recyclers and experienced residents, facilitating efficient recycling practices.

Relation

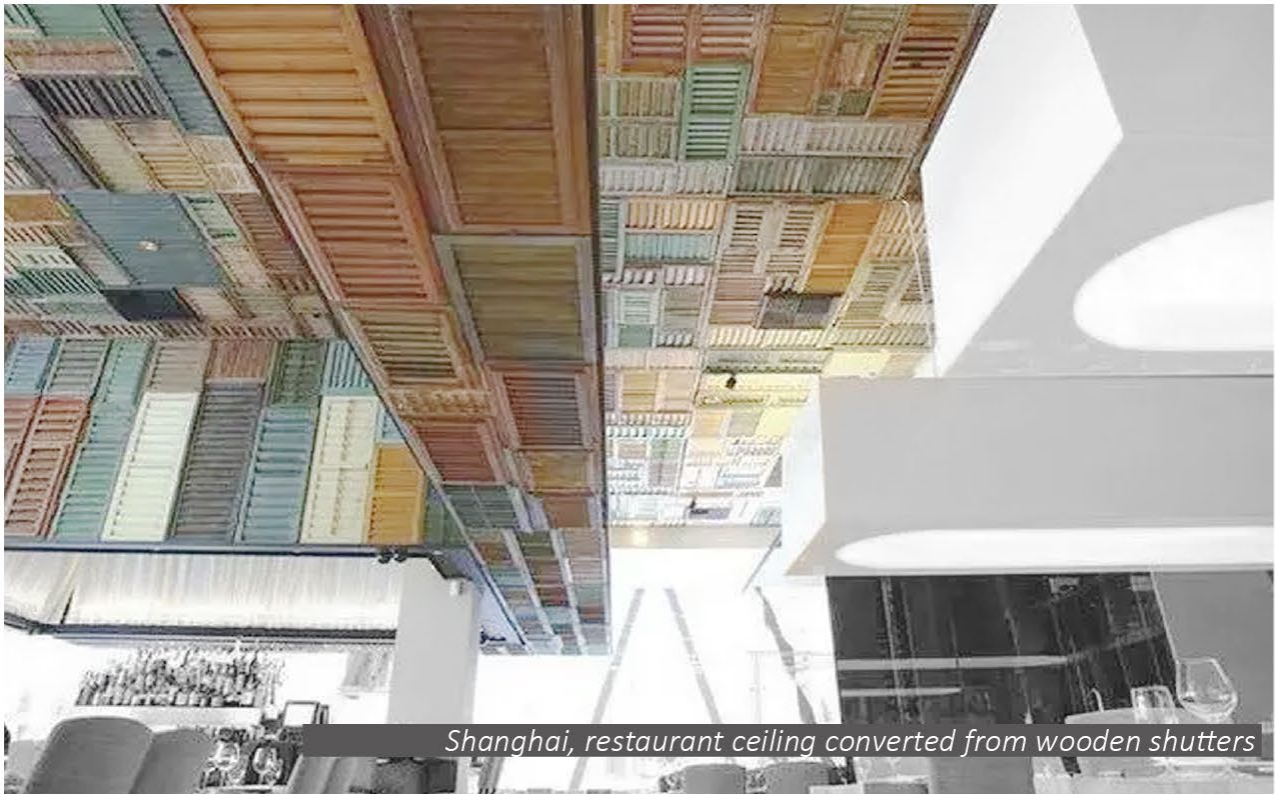
R6, R8, S4, S5, S6

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration



Shanghai, restaurant ceiling converted from wooden shutters

Source: Quarta & Armando (2023)

Description

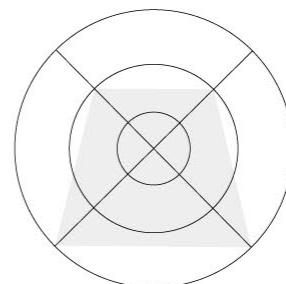
maximizing the reuse of materials from demolished or structurally unsound buildings. Priority is given to directly reusing materials such as repurposing bricks for constructing planting beds. Where direct reuse is not feasible, materials like cement or bricks are crushed and repurposed for constructing roads, enhancing resource efficiency and reducing waste.

Relation

R6, R7, S4, S5, S6

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

R9

MAKING COMPOST ON SITE

Resources Looping

Circular Practice



Neighborhood committee members in a community in Ningxia, China, are explaining how to use aerobic composting bins

Source: The Paper(2020)

Description

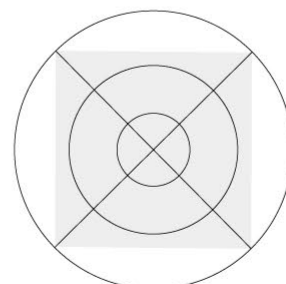
setting up designated areas within the community to compost organic waste. By composting food scraps and other biodegradable materials on site, the community can significantly reduce food waste. The resulting compost can be used to enrich the soil in local community gardens and farms, promoting sustainable agricultural practices and reducing the need for external fertilizers.

Relation

R1, R2, R3

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

R10

LOCAL COLLECTION POINTS OF SORTING WASTE

Resources Looping

Urban/Spatial Design



A waste segregation collection station equipped with a hand-washing sink and tool room in Huayang, Chengdu

Source: Tengxun News(2024)

Description

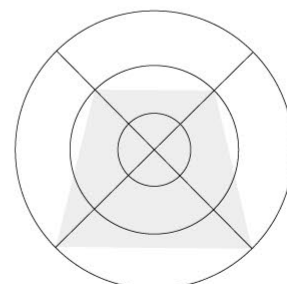
Implementing local collection points for sorting and recycling waste supports the direct local reuse of materials. These stations enable residents to sort their waste into categories such as plastics, metals, and food waste. This separation helps streamline recycling processes and ensures that food waste is specifically processed for composting, further reducing the community's environmental footprint and enhancing local waste management efficiency.

Relation

R5, R10, R13

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

R11

NEIGHBORHOOD CIRCULAR LOGISTICS HUB

Resources Looping

Circular Practice



Source: Extreme Labs(2016)

Description

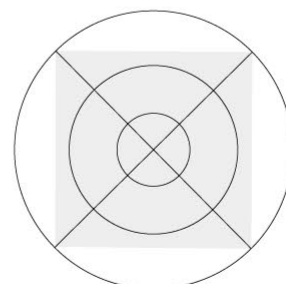
Each community will establish a circular logistics hub to prevent food waste by housing a community refrigerator. This hub facilitates the redistribution of surplus food, reducing waste. Additionally, it will be equipped with various repair tools and workshops to assist local residents in handling and repurposing collected recyclable building materials.

Relation

R10, S7

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

R12

INCENTIVES FOR RESEARCH & DEVELOPMENT

Resources Looping

Policy and people network



Source: Standing Committee of the National People's Congress(2018)

Description

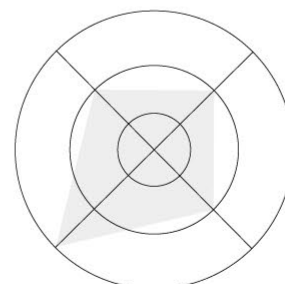
The government promotes research and development projects related to food recycling through policies, funding, space provision, and tender support. For example, the Circular Economy Promotion Law, issued in 2018, mentions support for relevant research. For scholars, these government-backed topics are more likely to secure research funding, thereby attracting more researchers to develop innovative products and technologies.

Relation

R1, R2, R3, R5, R7, S4, S5, S6

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

R13 PLACE-BASED FINANCIAL LEVERS

Resources Looping

Policy and people network



In Chengdu's Tongzi Tingyuan neighborhood, environmental protection companies work with the neighborhood to put in smart equipment that rewards points for cash withdrawals.

Source: Political Affairs Sichuan (2019)

Description

A mix of incentives and disincentives to influence behavior. Incentives, also known as 'carrots,' include tax breaks, low-threshold financing options, and stimulus funds. These are designed to attract real estate developers who may not initially prioritize using recyclable building materials. On the other hand, our disincentives or 'sticks,' aim to penalize developers who illegally dump building material waste. Additionally, this strategy encourages farmworkers to engage in waste separation

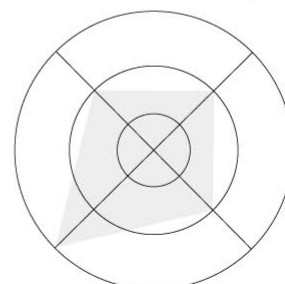
Relation

R8, R9, R10

Assessment

Distributive Justice

Spatial Adaptability



Resources Looping Ecological Regeneration

S1

FARMING FOR PUBLIC LEARNING

Social Adaptation

Policy and people network



Participants at the Chengdu Greenway Harvest Festival are learning how to thresh rice.

Source: Souhu News (2021)

Description

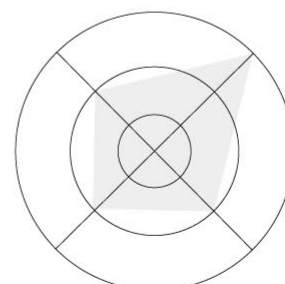
The greenway farmlands will regularly host harvest festivals and agricultural experience activities, offering small plots of land for private families to adopt and cultivate. This initiative aims to enhance residents' understanding of the reasons behind the farmland restoration, including the process of removing construction debris and rehabilitating the soil.

Relation

S7, E1, E3

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

S2 PUBLIC FACE

Social Adaptation

Urban/Spatial Design



Source: Douban (2018)

Description

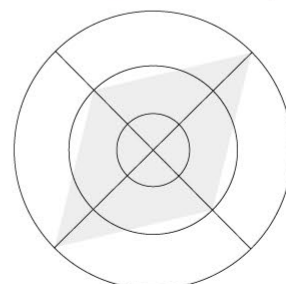
To give recycling activities a public interface, such as entrances on main streets, increases community residents' understanding and interest in participation. Additionally, an attractive and vibrant public interface can also attract curiosity from outside residents and potential commercial investment.

Relation

S4, S5, S6, R1

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

Social Adaptation

Urban/Spatial Design



Photograph by author

Description

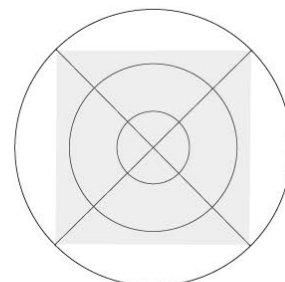
On vacant streets within the community, utilize construction debris to create food planting beds. This strategy enhances the utilization of overlooked spaces, formally integrates informal planting practices, and increases opportunities for local food access, thereby shortening the food supply chain.

Relation

S2, EO5, EO6

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

S4

PRIORITISE BUILDING RENOVATION

Social Adaptation

Urban/Spatial Design

**Description**

Source: URBANUS (2016)

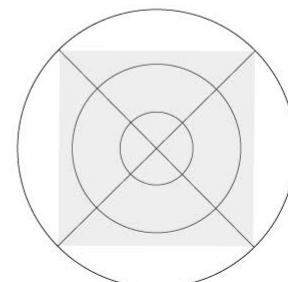
Renovating and repurposing existing buildings over constructing new ones to conserve resources. For instance, transforming abandoned factories into housing or office spaces supports sustainable development by utilizing existing structures and reducing environmental impact.

Relation

S2, S5, S6

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

Social Adaptation

Urban/Spatial Design



Source: Designboom (2017)

Description

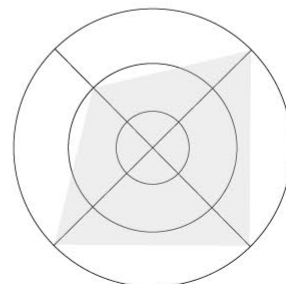
When constructing new buildings, adaptability must be a key consideration. One approach is the use of modular buildings made from new recyclable materials such as straw. These structures can be easily dismantled and relocated when the function of the site changes. Similar examples already exist in Europe, and these building techniques and designs need to be updated for the Chinese context.

Relation

S2, S5, S6, R6, R7, R8

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

Social Adaptation

Urban/Spatial Design



In 2017, an architectural biennale was held in Shenzhen's Nantou urban village, where more than two hundred exhibitors from around the world explored China's mode of urban renewal in the context of globalization through works that integrate architecture, art, and design

Source: URBANUS (2016)

Description

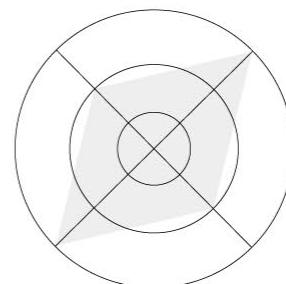
Engaging architectural firms in design exhibitions focused on urban village revitalization can explore innovative architectural transformations. These artistic and exploratory activities not only broaden the possibilities for urban village transformation but also attract external attention and potential investment, fostering community development and cultural enrichment.

Relation

S4, S5, R6, R7, R8

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

Social Adaptation

Policy and people network



Source: The Paper(2020)

Description

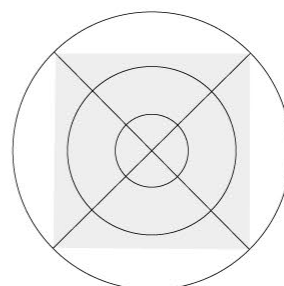
Community farms can serve as gathering places for people from surrounding neighborhoods and diverse backgrounds to come together and learn from each other. Migrant workers, who often possess extensive agricultural knowledge, can find a sense of recognition and community here. Additionally, urban residents will increasingly understand and appreciate the contributions these workers make to urban agriculture.

Relation

S2, S5, S6

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

E1

QUALITY LIVING ENVIRONMENT

Ecological Regeneration

Urban/Spatial Design



Image authorized by the author

Description

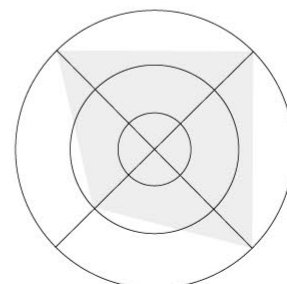
When implementing ecological regeneration and restoration strategies, it is crucial to consider how these ecological spaces can benefit surrounding residential communities, especially urban villages. These spaces should be accessible to residents, with features such as green corridors or walking trails, which create a better living environment for residents by integrating ecological spaces into their daily lives.

Relation

E2, E3, E4

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

E2

MUTI-FUNCTIONAL INDUSTRIAL BUFFER

Ecological Regeneration

Urban/Spatial Design



Source: EADG Studio(2020)

Description

Construct buffer zones such as forests or wetlands around circular industrial areas near ecologically sensitive regions like rivers. These buffers should include vegetation planning and recreational design to enhance biodiversity and provide spaces for public recreation.

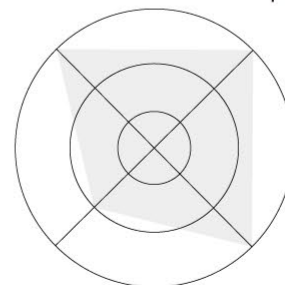
Relation

E1, R1, R2

Assessment

Distributive Justice

Socio-spatial Adaptation



Resources Looping

Ecological Regeneration

E3

RESTORATION OF SURFACE WATER SYSTEM

Ecological Regeneration

Urban/Spatial Design



Irrigation canals in a rural village in Meishan, Chengdu

Source: Xinhua News(2020)

Description

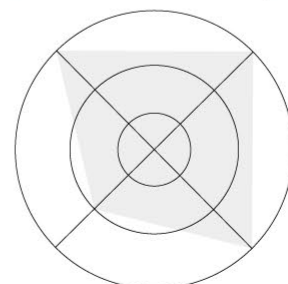
Restore the previously existing but now idle and dried irrigation channels from the original village within the urban village community. This restoration provides irrigation water for the community-shared farms and vegetable gardens. Around the water channels, a green belt of a certain width will be designed as a river buffer to protect the water source while simultaneously enhancing the living environment of the urban village.

Relation

E5

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration



Part of the forest that has been restored so far inside the Chengdu Greenway.

Image authorized by the author

Description

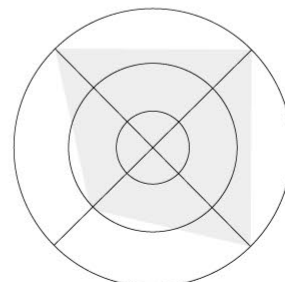
Restore the fragmented woodlands within the greenway farmland, appropriately expanding them and avoiding converting them entirely into farmland. Enrich the vegetation of these woodlands to bring the necessary biodiversity for agricultural production.

Relation

E1, E5

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration



Photograph by author

Description

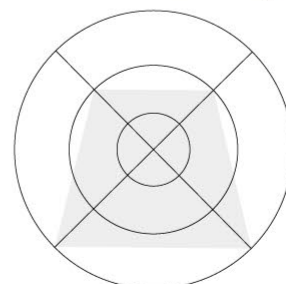
Regenerate the soil in the idle agricultural fields surrounding informal residential areas. This includes removing weeds and clearing illegally dumped construction debris from the soil. Plant leguminous plants to enrich the soil, providing a healthy foundation for community farm development. Subsequent planting activities in the community farm should minimize external inputs, using organic fertilizers to continuously protect soil health.

Relation

E3, E4

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

EO1 FLEXIBLY OCCUPIED STREETS

Equal Opportunity for Development

Policy and people network



Street vendors outside a wet market in Chengdu during the Chinese New Year in 2024

Photograph by author

Description

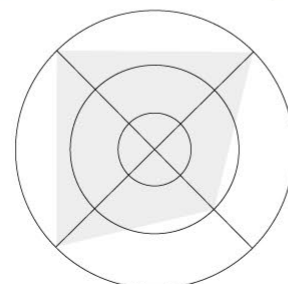
In Chengdu, unlike other regions, urban village streets within informal residential areas are relatively wide, especially the main streets. Allowing street food vendors to set up stalls in these idle spaces facilitates the direct local sale of vegetables grown in community farms. This helps establish a local food supply chain, enhancing the accessibility of freshly grown produce within the community.

Relation

EO5, EO7, S3

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration



Photograph by author

Description

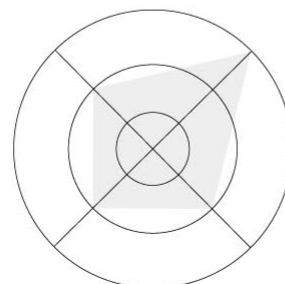
Establish a transparent planning information platform to publish the processes of urban renewal plans and regularly update the relevant communities on the progress. This helps migrant workers understand the upcoming changes in their communities and provide their own input based on this understanding. Previously, planning processes were often made public through websites or bulletin boards, which were more about form than substance and rarely read by people. A practical improvement would be to organize urban renewal information sessions to communicate directly with migrant workers face-to-face.

Relation

S4, S6, EO5, EO6, EO7

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

Equal Opportunity for Development

Policy and people network



Source: Jinjiang Human Resource Center (2023)

Description

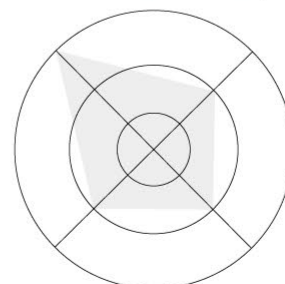
The creation of the circular industrial park and the reclamation of farmland have generated numerous job opportunities for migrant workers from nearby urban villages. One approach to facilitate this is by formalizing the informal labor markets within these villages and delivering company recruitment information directly to them. Presently, these informal labor markets often occupy public gardens and squares, where small businesses post job notices on bulletin boards.

Relation

R1, R3, R5

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

Equal Opportunity for Development

Policy and people network



An electronics recycling company in Shenzhen training newly recruited workers.

Source: Tengxun News(2024)

Description

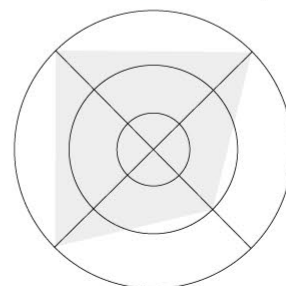
As the circular industry grows, companies increasingly need skilled workers with relevant skills. In order to avoid the exclusion of migrant workers without experience from the job market, governments should issue policy requirements for enterprises to recruit new employees and provide appropriate training services.

Relation

R1, R3, R5

Assessment

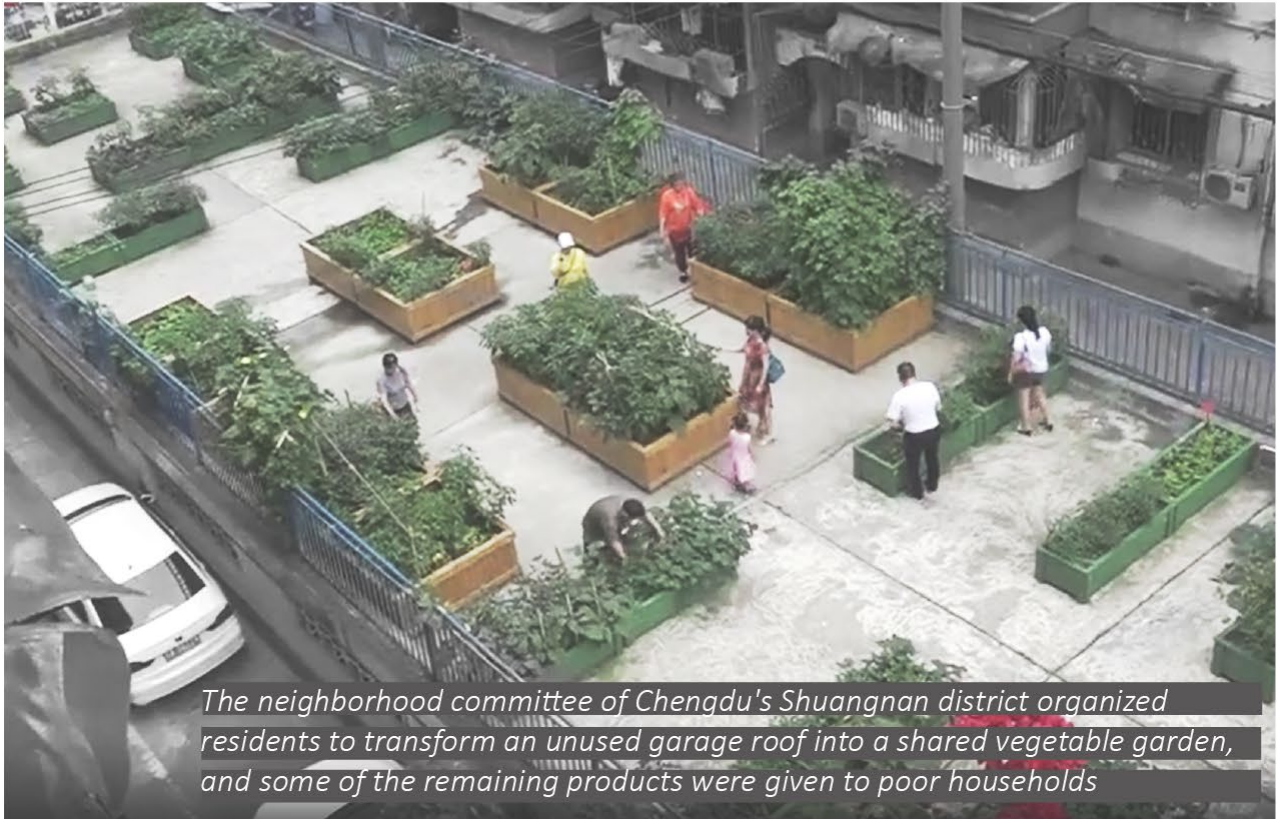
Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

Equal Opportunity for Development

Policy and people network



Source: Douban (2018)

Description

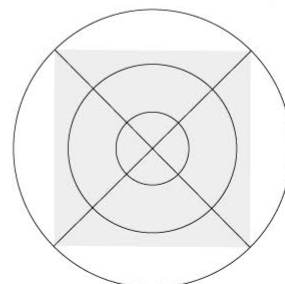
For certain idle lands and buildings, local residents are permitted to self-manage and engage in recycling activities, such as establishing community farms or temporarily storing usable construction debris like wood and windows. This approach helps facilitate the local circulation of resources, effectively shortening the resource recycling chain.

Relation

EO1, S7

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

Equal Opportunity for Development

Policy and people network



Source: Social Governance Review (2020)

Description

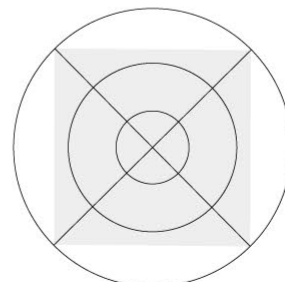
In urban villages requiring regeneration, establish a community planning guidance team to coordinate the circular city renewal process and develop locally applicable governance plans. These consultants will explain government documents to local residents, engage with local stakeholders, and organize co-design workshops to gather extensive public input. They will serve as a crucial communication bridge between the government and grassroots communities.

Relation

EO1, EO5, EO7

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

EO7 DIVERSE CIVIL SECTOR

Equal Opportunity for Development

Policy and people network



Source: Chengdu Urban and Rural Community Development and Governance Committee (2018)

Description

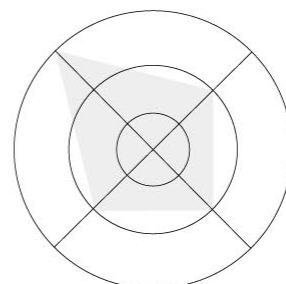
When making decisions about community regeneration planning, it is important to invite all stakeholders to participate in discussions about the proposed plans. In addition to businesses and government agencies, it is crucial to invite representatives of migrant workers to express the needs of vulnerable groups. It is also necessary to involve public sector organizations that have relevant construction experience, such as family farm organizations with community composting experience, to contribute to the discussions.

Relation

EO5, EO6

Assessment

Distributive Justice Socio-spatial Adaptation



Resources Looping Ecological Regeneration

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