Re-imagining Periphery | 皖北入长

On Identifying Development Opportunity of North Anhui through Place-based Circular Transition

探索在地循环经济转型视角下的皖北发展契机

P5 presentation

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Studio: Planning Complex Cities
Faculty of Architecture and the Built Environment
Delft University of Technology

28-06-23

Report

Strategy booklet

TU Delft Department of Urbanism
BK Bouwkunde

Complex Cities

From rapid urbanization to the era of “stock development”

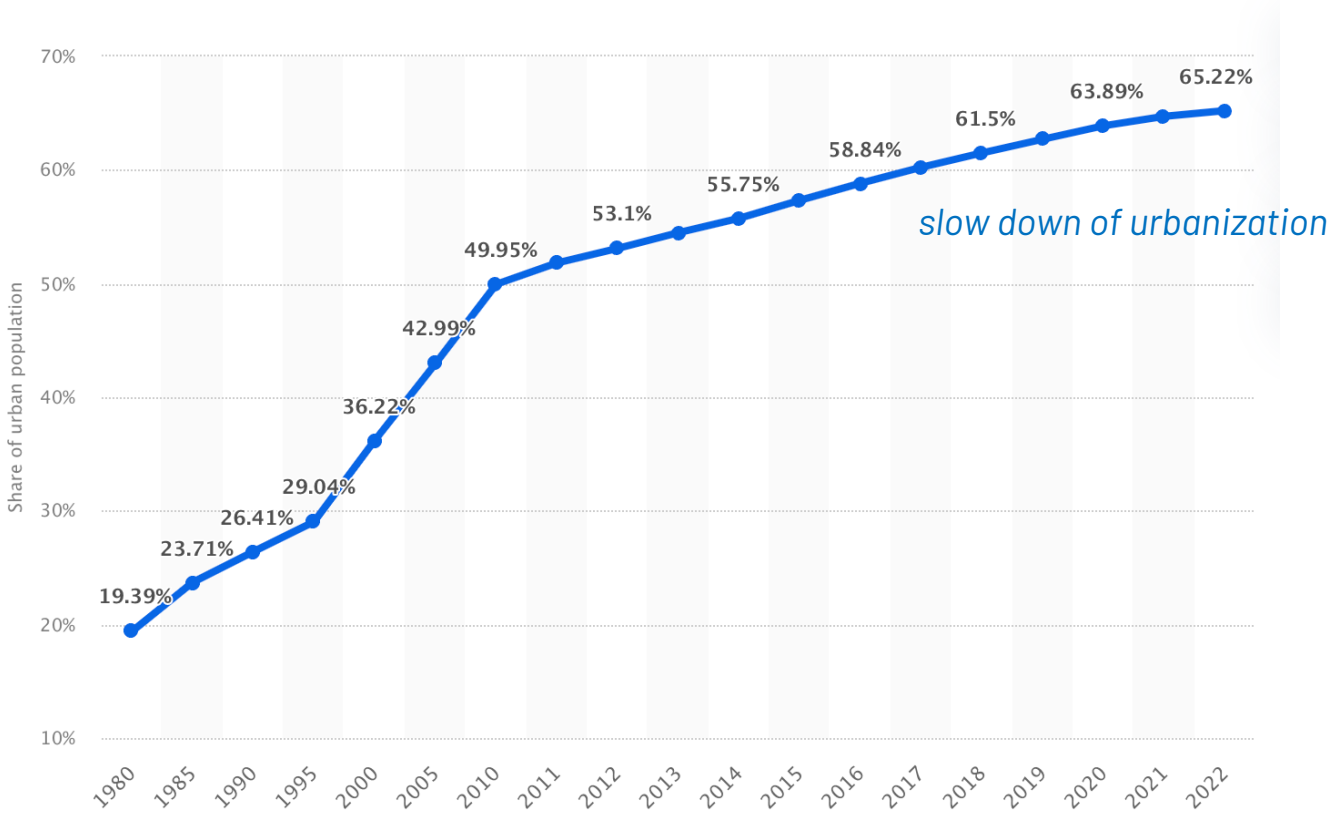
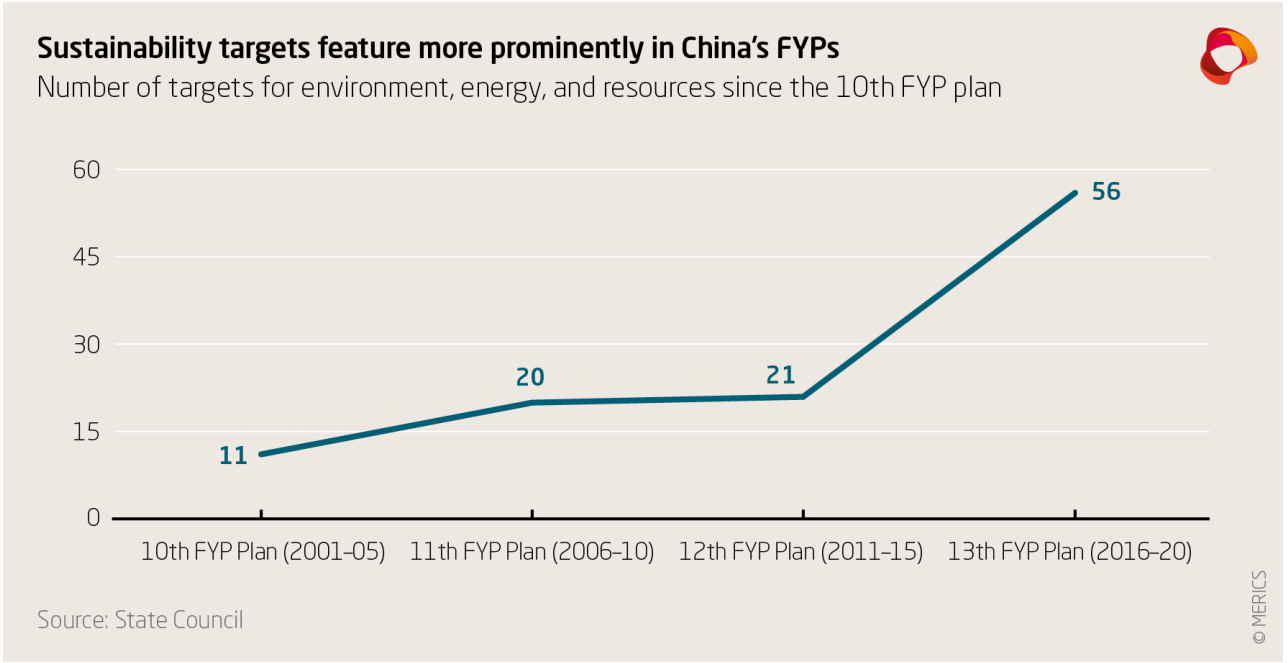


Photo taken by author

Degree of urbanization in China from 1980 to 2022

Data Source: National Bureau of Statistics of China

From "rough development" to "high-quality development"

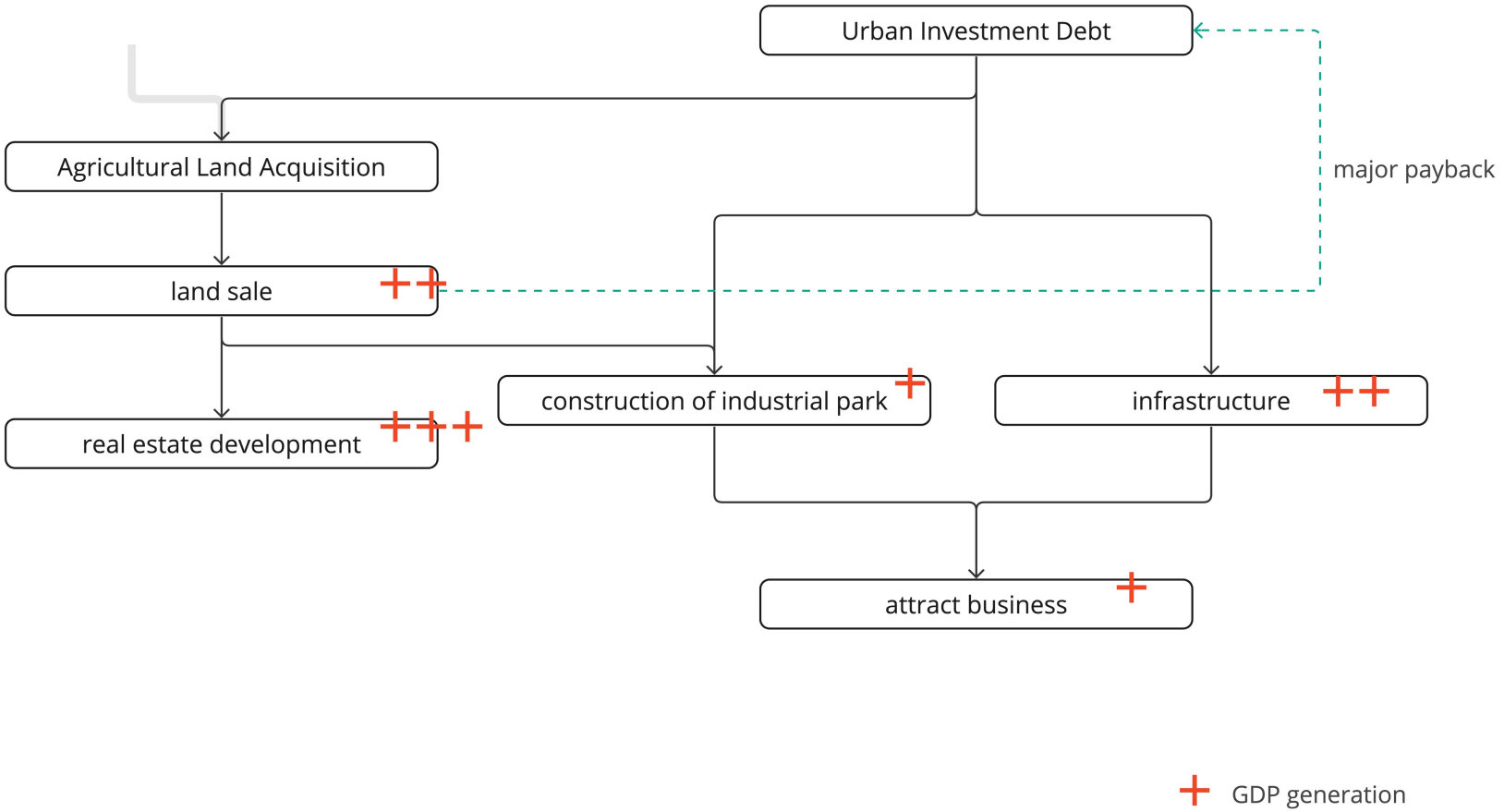


* FYP=five years plan

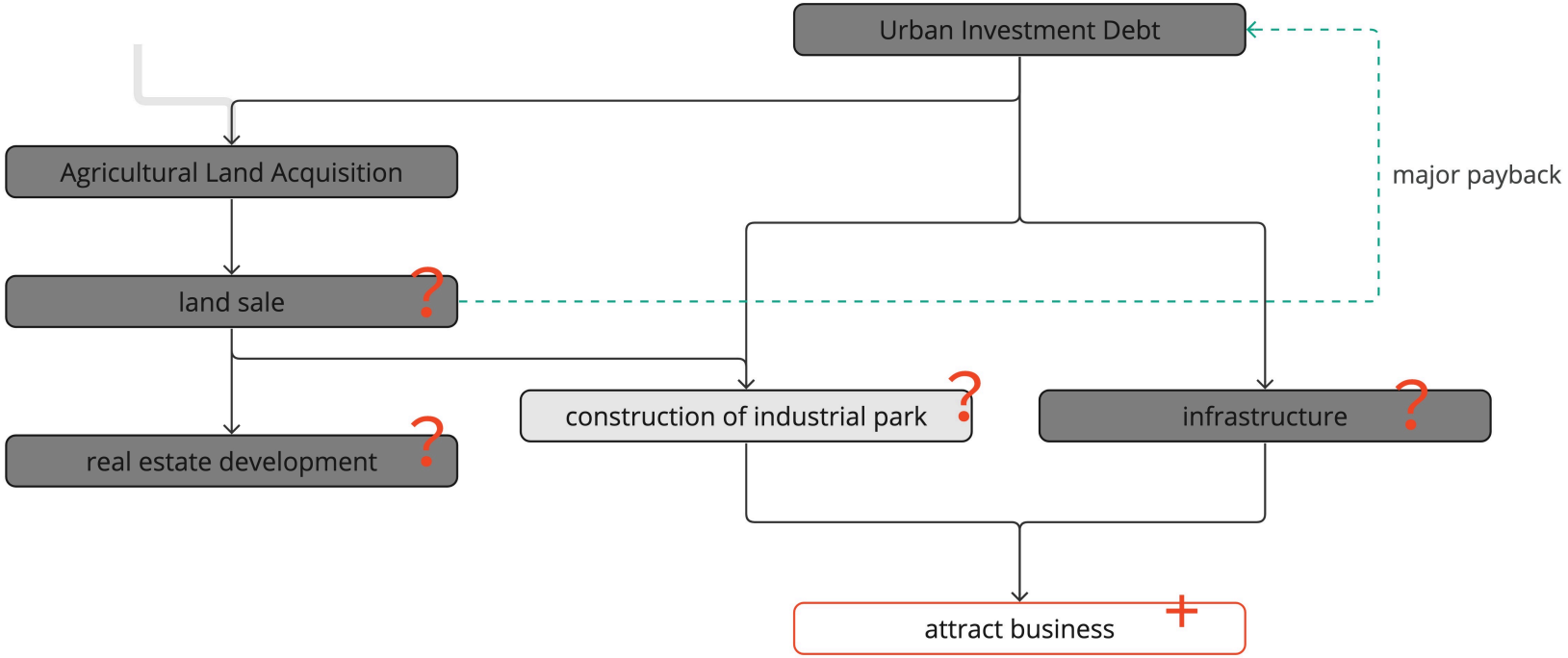
Data Source: Mercator Institute for China Studies

"Green mountains and green waters, mountains of gold and silver."

Impact: Previous economic development model of **land economy**



Impact: Previous economic development models **will be challenged**



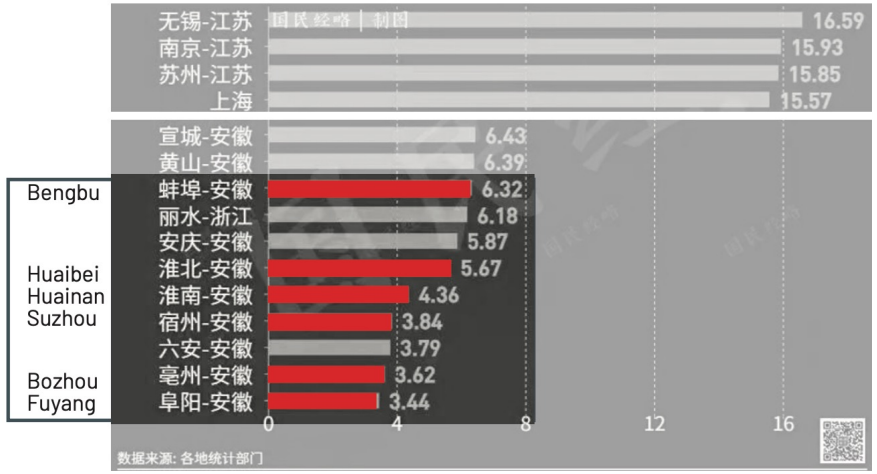
? contribution to GDP may stop


Leading cities with talents, capital and technology *are capable of* focus on quality more than mere quantity.

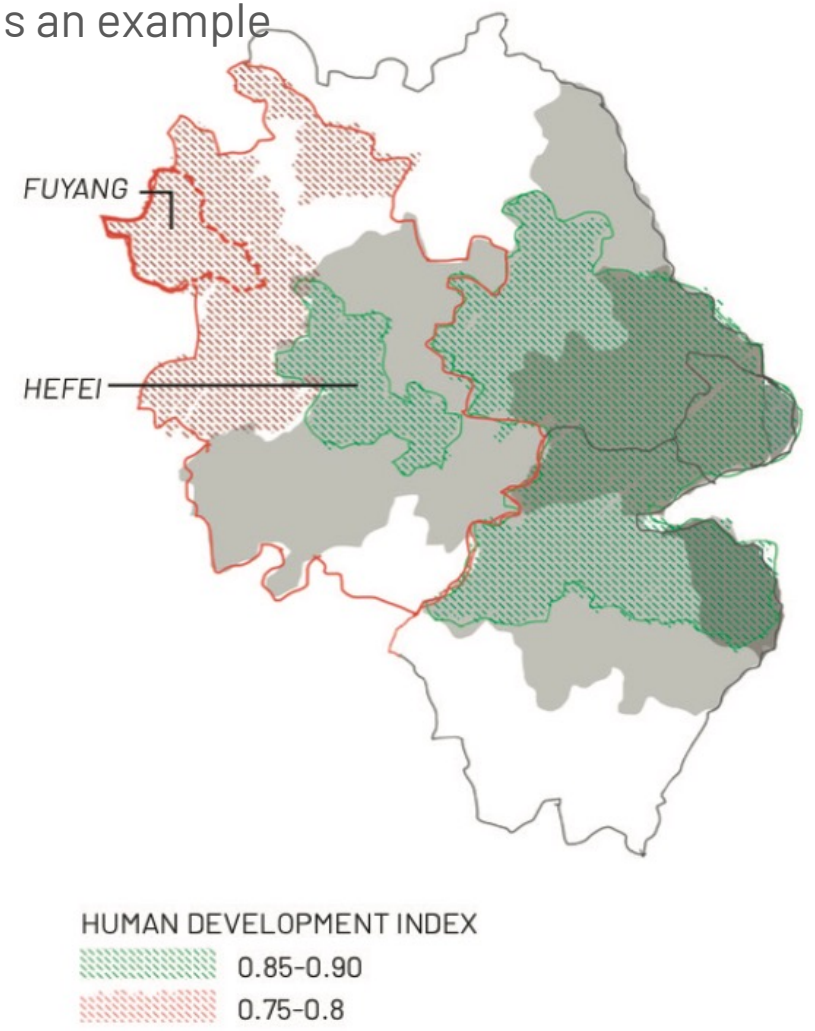
But what about cities with insufficient resources?

Will the imbalance become even larger?

Regional imbalance between core and periphery– take YRD as an example



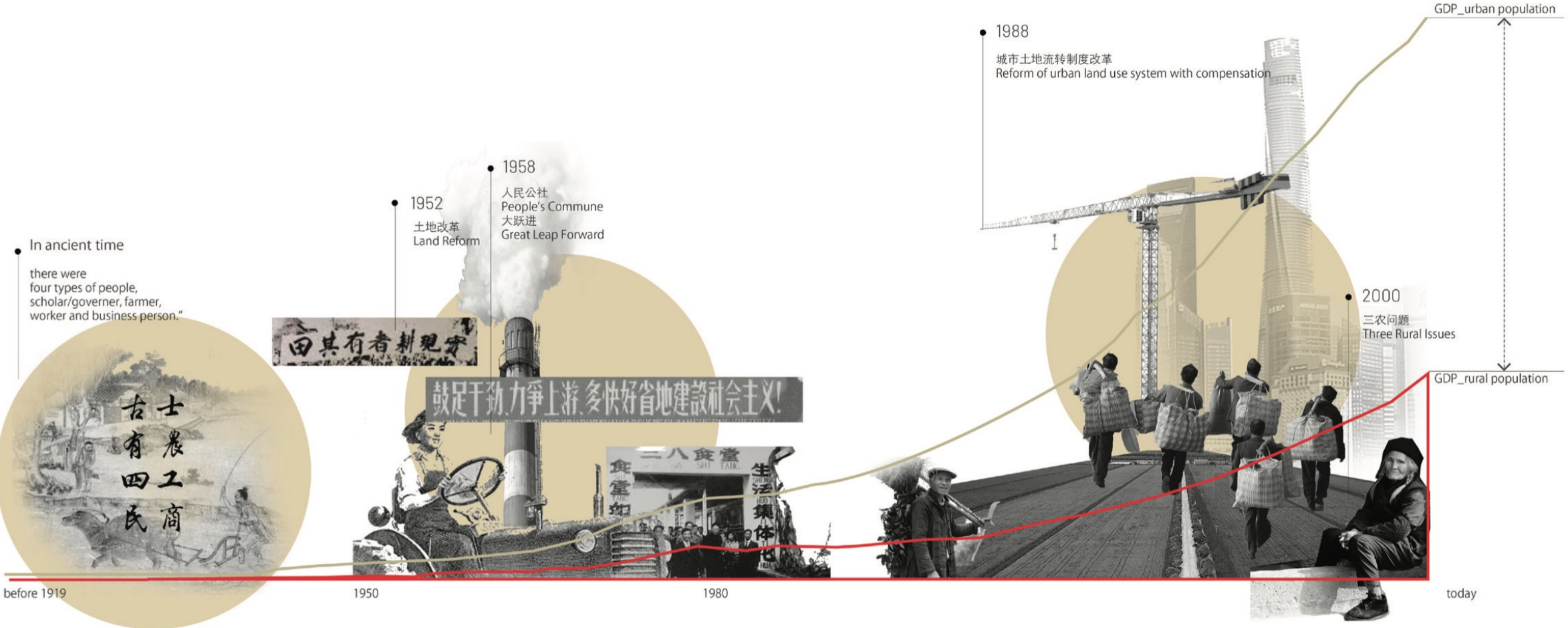
[regional development gap by GDP per capita]
Source: Guominjingwei 国民经纬



[regional development gap by HDI]
Source: UNDP - HDI

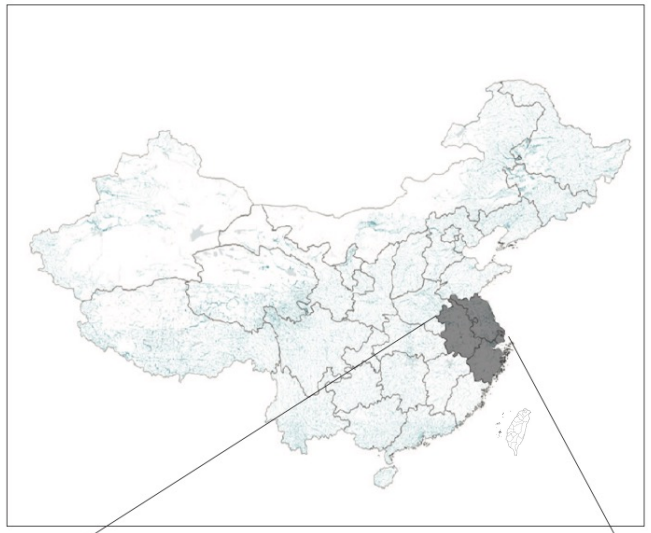
Will the imbalance be even larger?

Urban-rural dichotomy

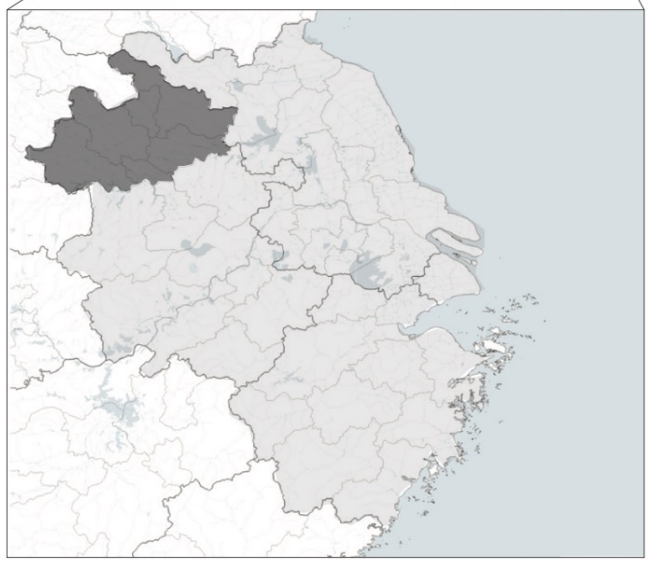


[timeline of urban-rural disparity]

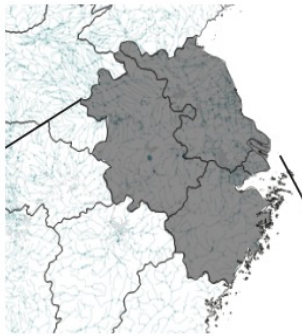
LOCATION



LOCATION OF YRD



LOCATION OF CASE STUDY AREA



Yangtze River Delta

Area: 360,000 km²
Population: 236 million
Urbanization rate: 75.01% (2021)
GDP: c.a. $18.2 trillion (2021)

North Anhui 6 cities

Area: 39,000 km²
Population: 26 million
Urbanization rate: 59.39%
GDP: c.a. $1.1 trillion (2020)

The Netherlands

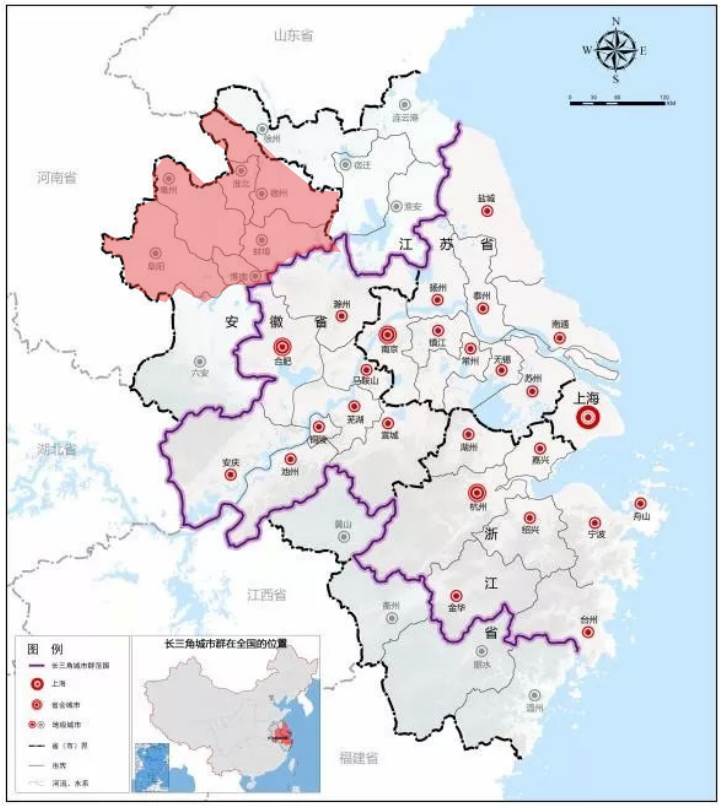
Area: 41,543 km²
Population: 17.53 million
Urbanization rate: 92.57%
GDP: c.a. $1.02 trillion (2021)

pic 1.1 Fuyang City Drone Photo, source: bilibili @zhifeijihangpai

pic 1.2 Fuyang City Drone Photo, source: bilibili @zhifeijihangpai

pic 1.3 Linquan County Countryside, source: bilibili.com @tiaotiaoxiaodouddu

Entry Point For The Discussion Of Regional Development Inequality



Range of YRD before 2019
Range of YRD after 2019
Case study area

2019.12

Outline of the Yangtze River Delta Regional Integrated Development Plan
By CPC Central Committee & State Council

officially includes all Anhui province into the planning area of Yangtze River Delta Regional Integrated Development Plan.

Three Major Problem

economy

Economic Stagnation

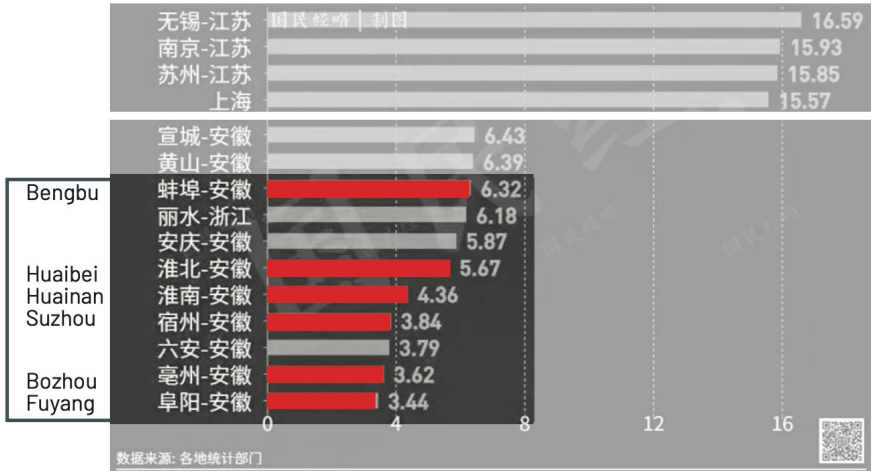
environment

Environmental Pollution

social

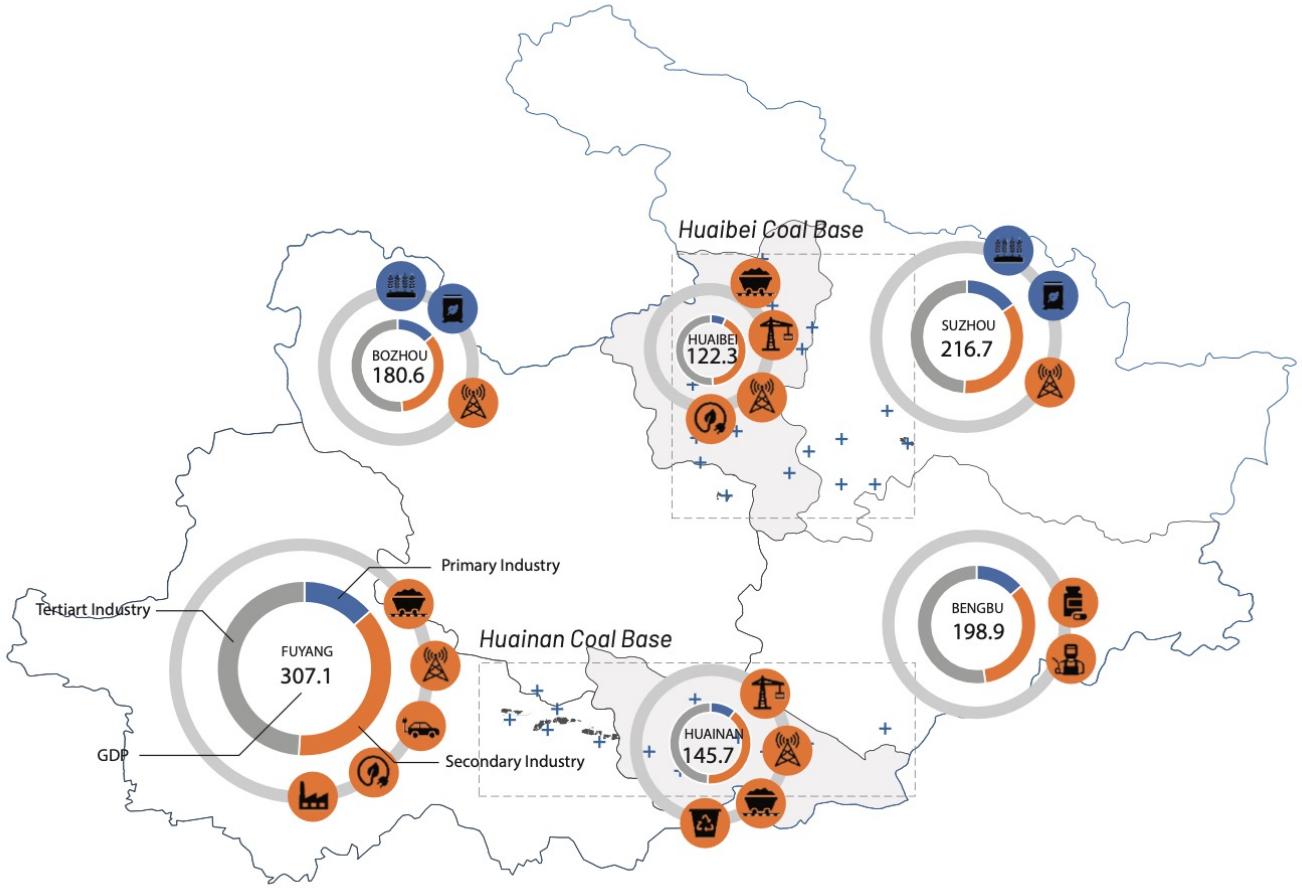
Large Population Outflow

Problem 1 | ECONOMY: provider of low value-add product to support core area



[regional development gap by GDP per capita]
Source: Guominjingwei 国民经纬

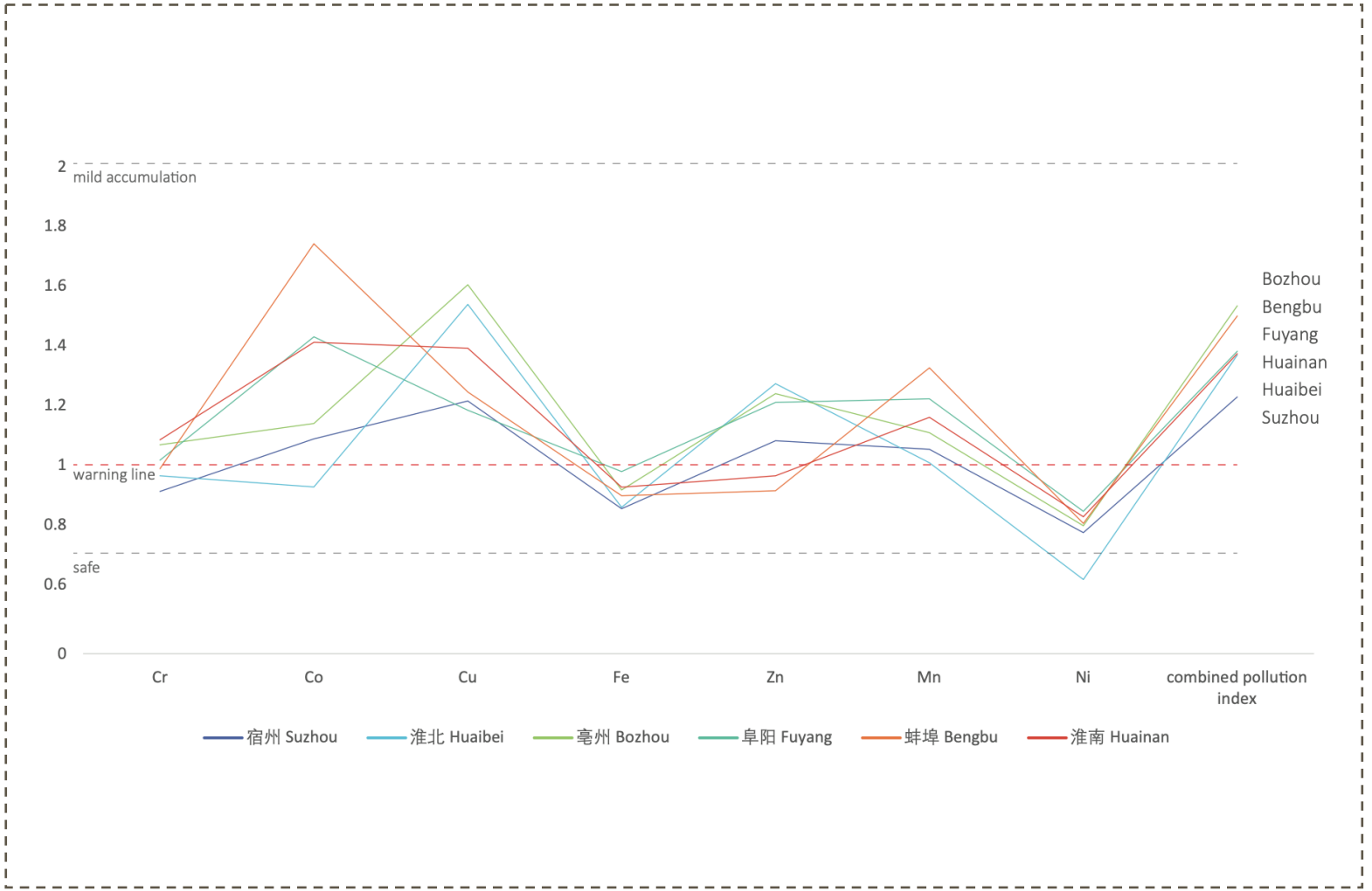
city	Leading industry
Bozhou	Agriculture, agri by-product, telecom
Fuyang	Telecom, new material, new energy vihecles, high-end manufacture, new energy
Huainan	Equipment manufacture, telecom, new material, environmental protection
Huaibei	High-end metal material, fine chemicals, high-end manufacture, biology, bio-food
Suzhou	Agriculture, agri by-product, telecom
Bengbu	Metal smelting and rolling processing, biomedicine



Problem 2 | ENVIRONMENT: bearer of the pollution left to the periphery

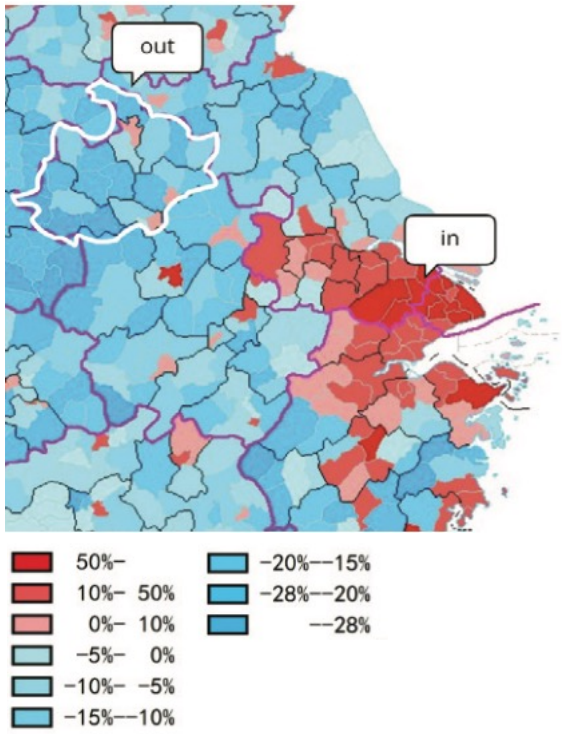
Eutrophication Of Waterbody

Lack of Management of Waste

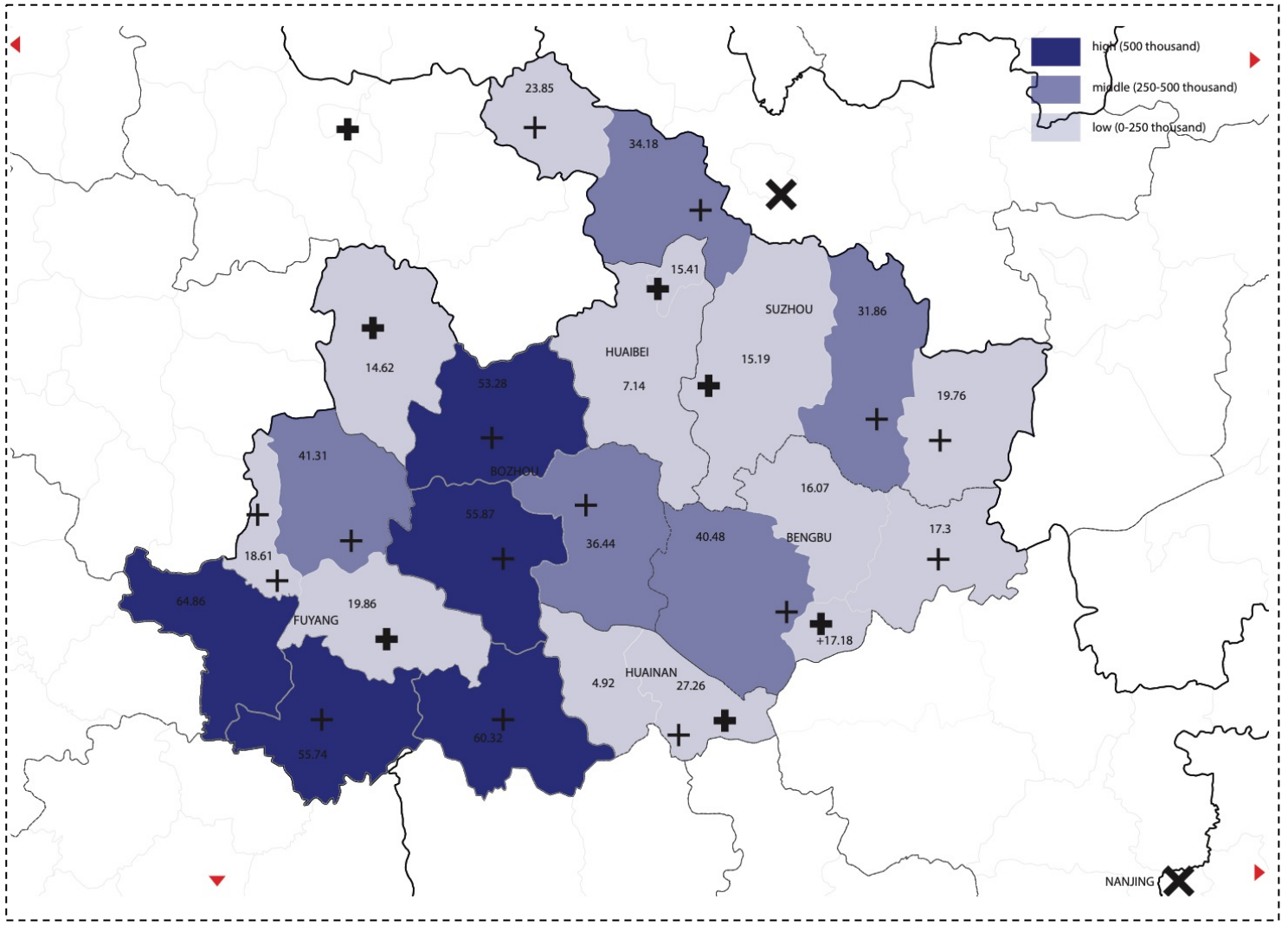


Drawn by author based on data source: *Ge, Yang et al.* Characteristics of heavy metal content and pollution evaluation of rural sporadic vegetable fields in northern Anhui

Problem 3 | SOCIAL ASPECT: losing population to more developed region core area



YRD migration flow (2010) Source: Zhi Hu



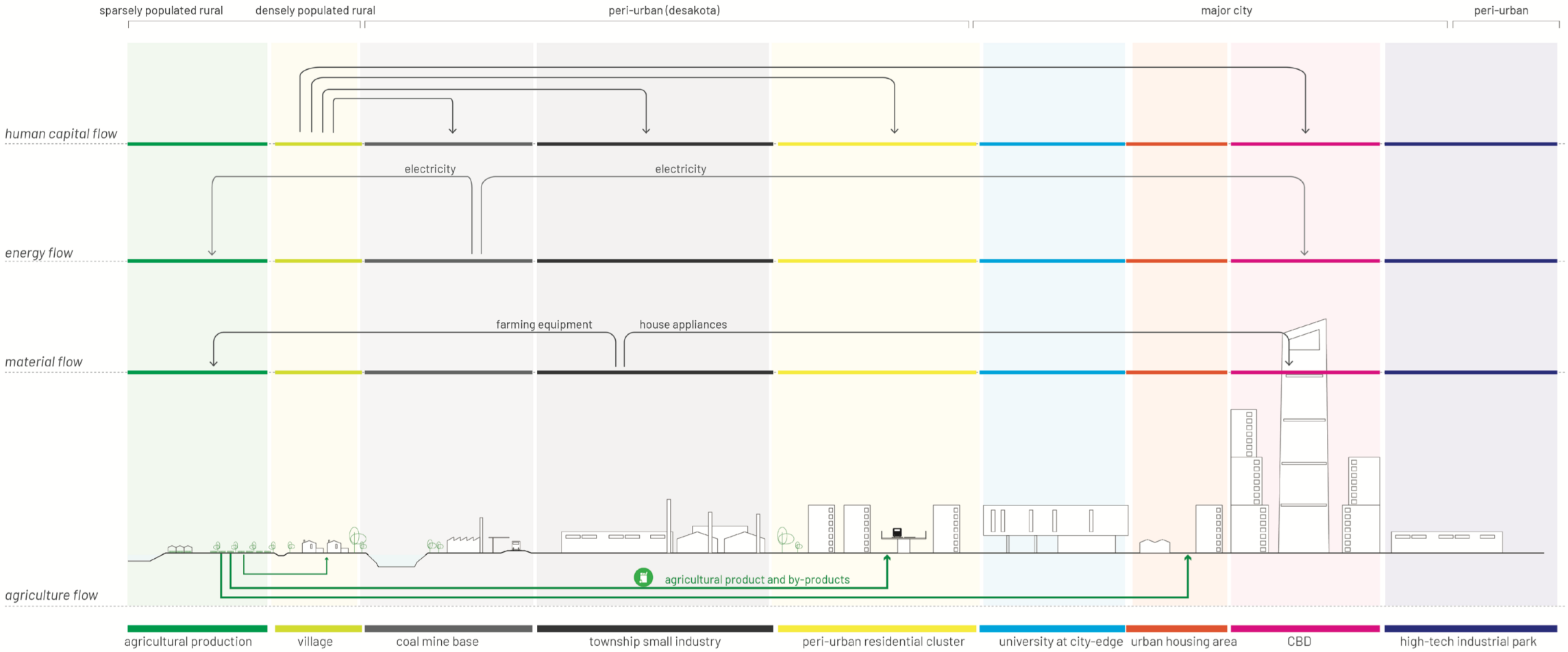
population outflow county level (2020)
Drawn by author, data source: Anhui Provincial Bureau of Statistics

A One-way Relationship

Economic stagnation

Environmental pollution

Large population outflow



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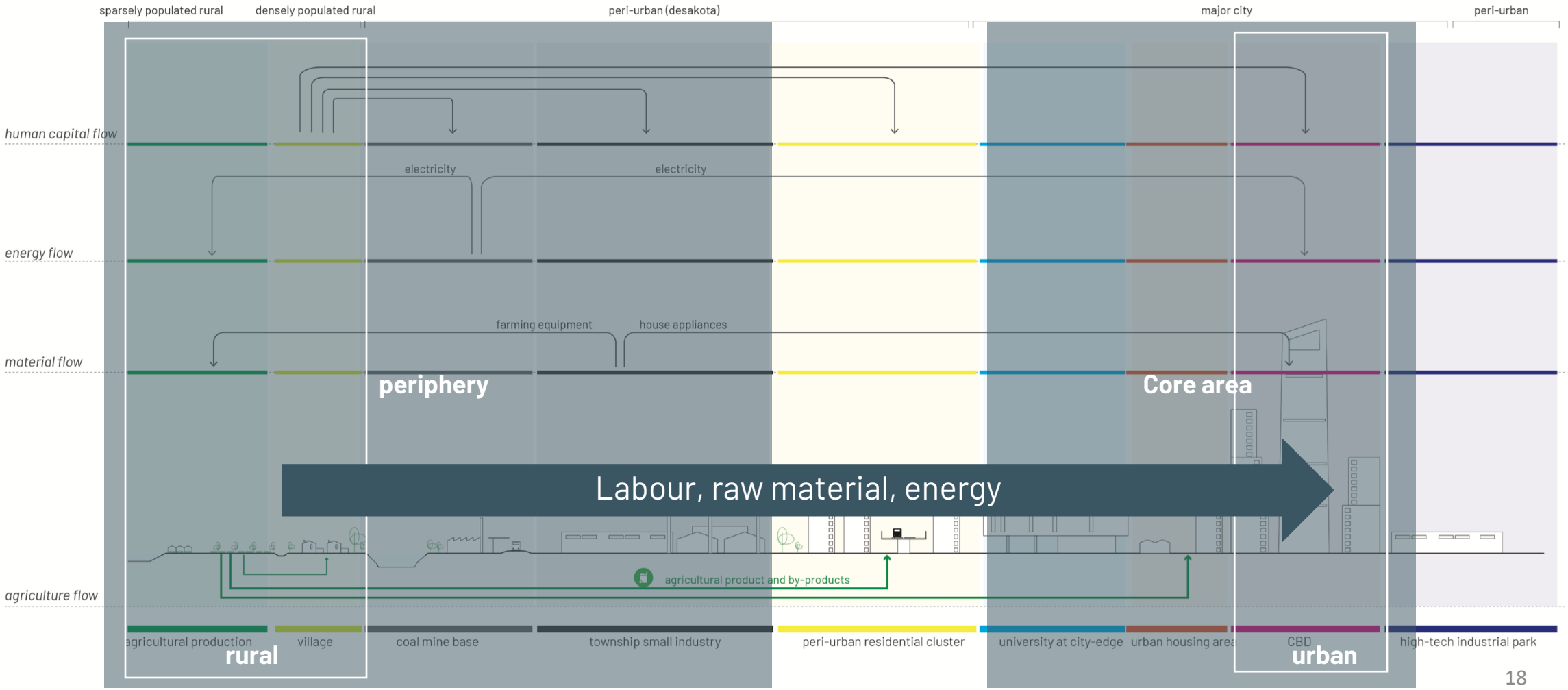
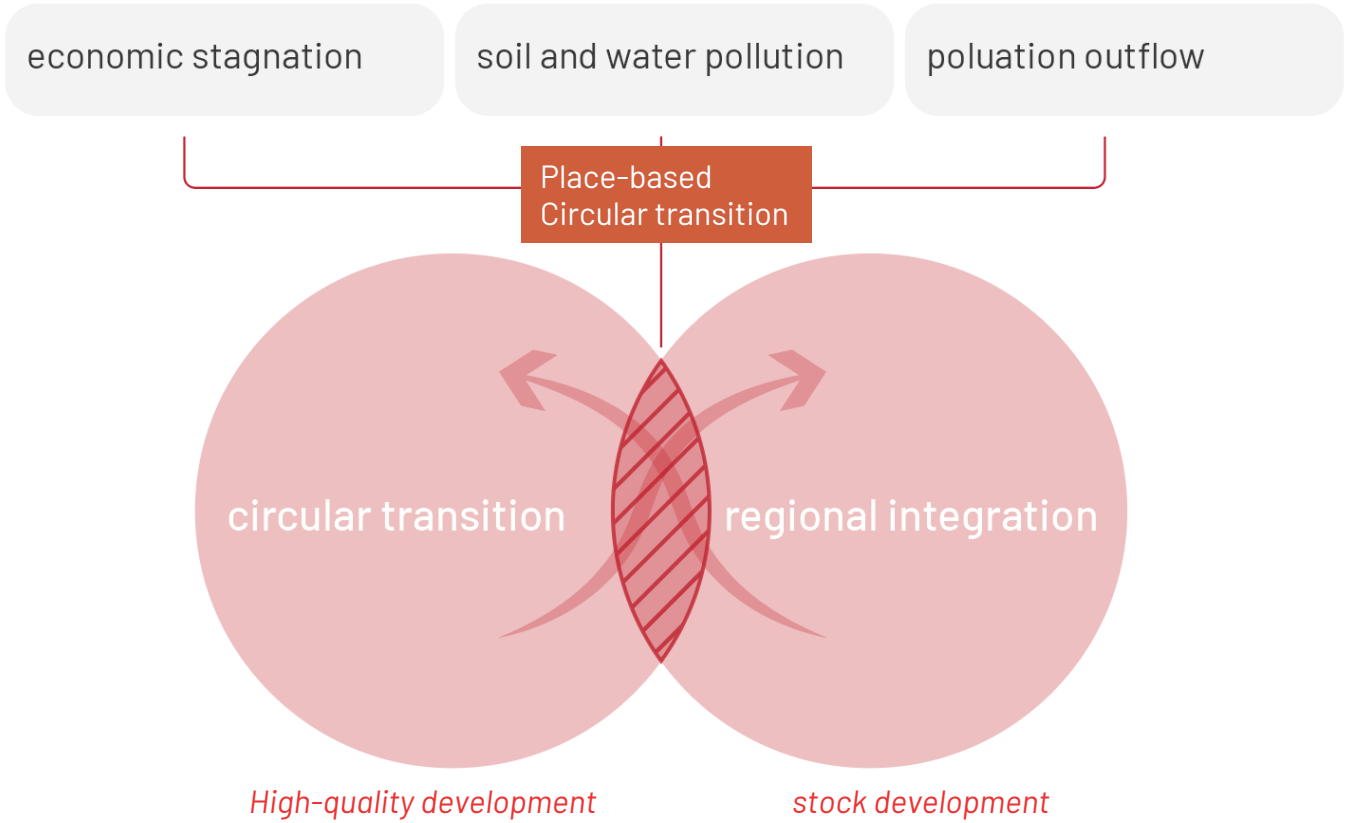


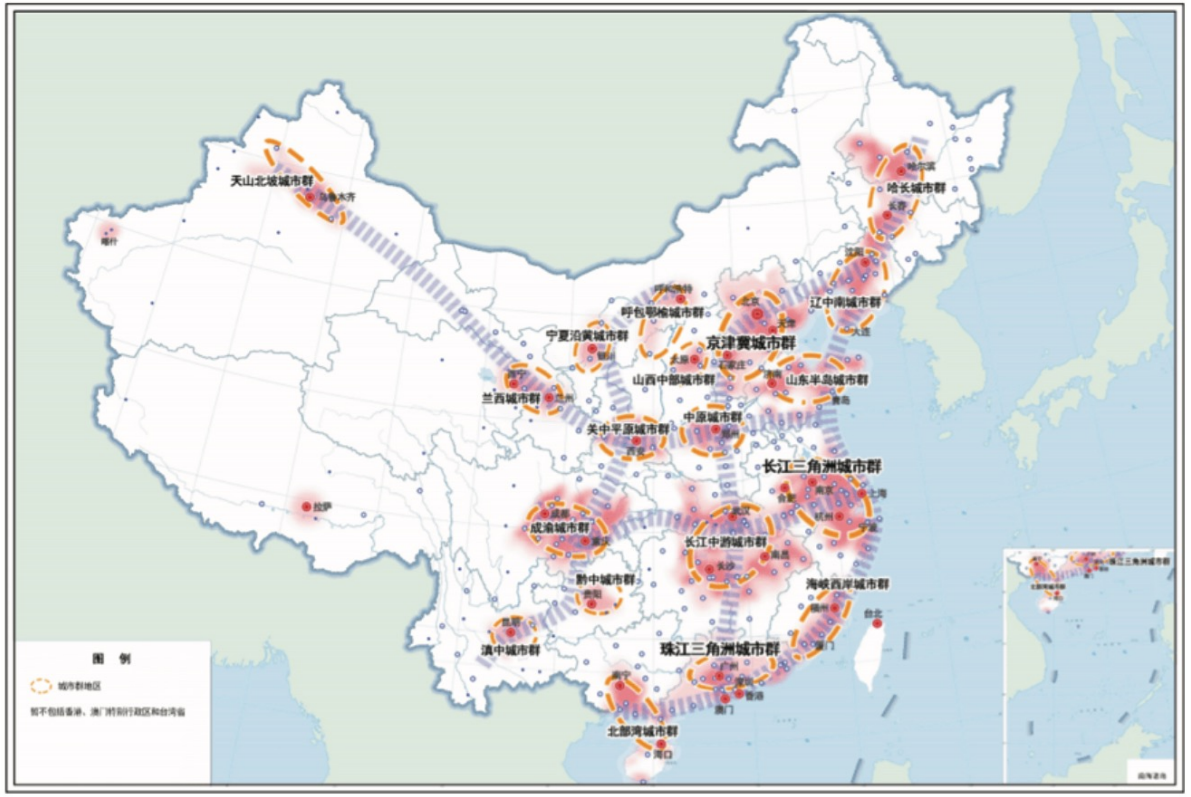
Extract opportunity from context: threat as opportunity



hypothesis: synergy between circular transition and urban agglomeration

Research Aim

- **Context**: transition into stock development era and quality development era
- **Research object**: north Anhui
- **Research Aim**: development opportunity brought by circular transition
- **Generalized aim**: to reconcile urban-rural and regional development imbalances in other urban agglomerations in China



Source: Haixi Real Estate

Main research question

how can place-based circular transition steer the sustainable development of north Anhui?

Sub research question 1

What resources and potential do north Anhui cities agriculture and related industry have in line with circular transition of Yangtze River Delta Urban Agglomeration?

Sub research question 2

What regional spatial planning and governance strategy are needed to build up regional circular transition?

Sub research question 3

What corresponding spatial and engagement strategies at the local scale can secure the feasibility of the circular transition?

Problem-Oriented Theory Exploration

Literature + cases in the field of...

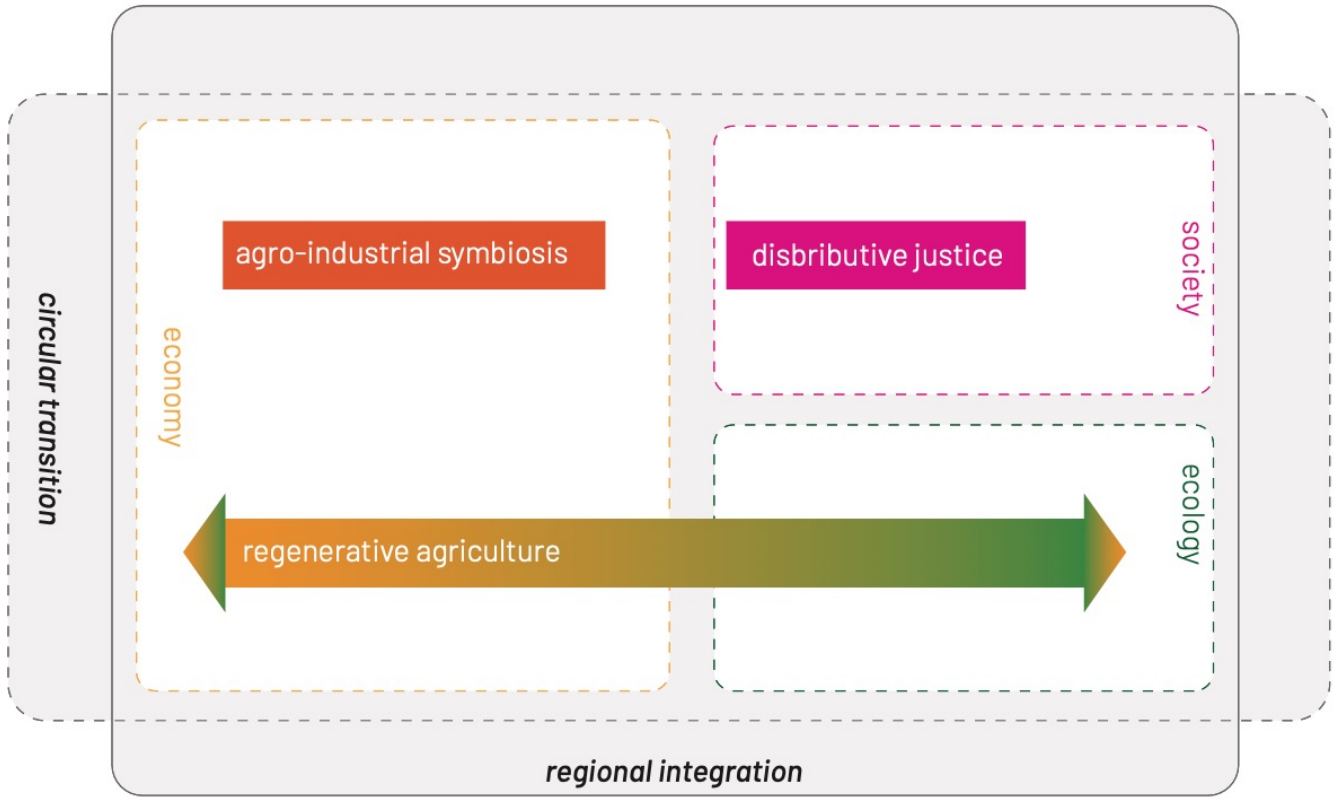
Circular Transition
Jo Williams. (2020) The role of spatial planning in transitioning to circular urban development

Regional Integration
Iain Docherty (2007) Exploring the Potential Benefits of City Collaboration
Fulong Wu. (2016) China's Emergent City-region governance: A New Form of State Spatial Selectivity through State-orchestrated Rescaling

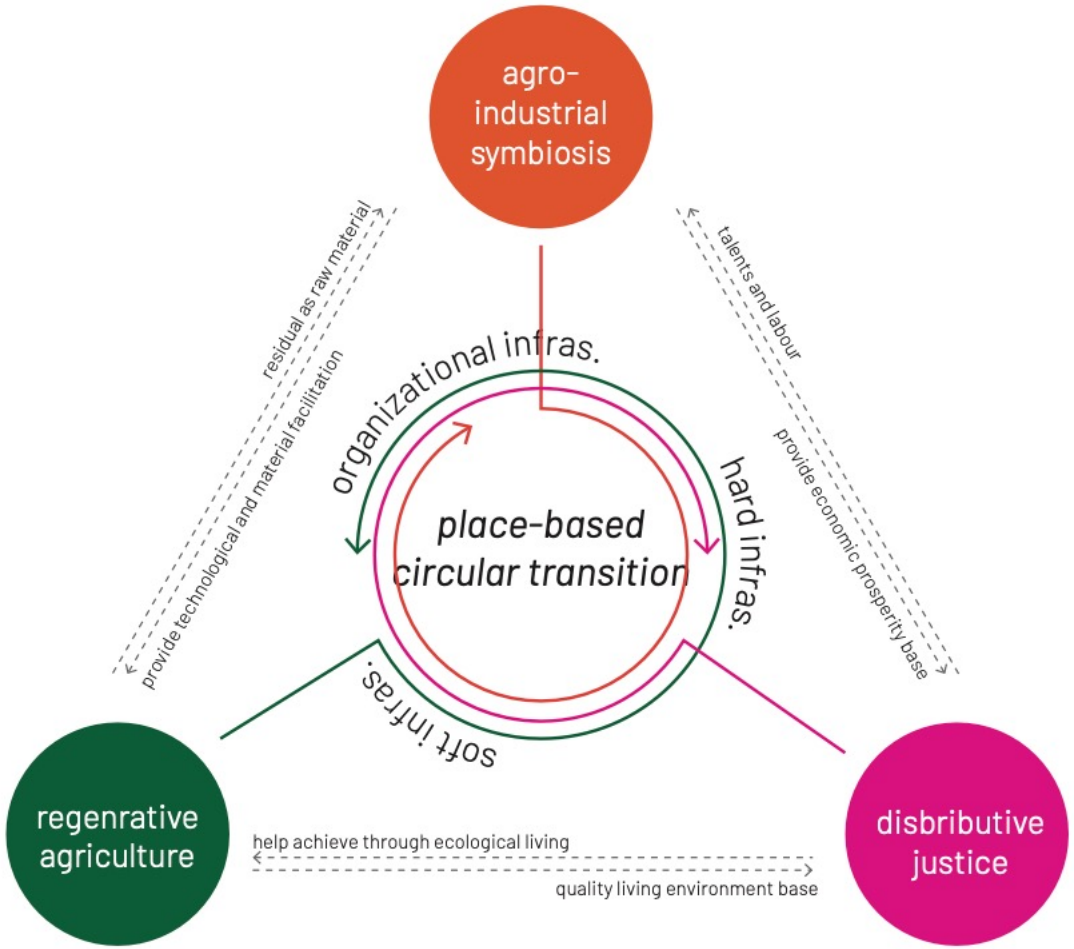
Agro-industrial Symbiosis
Angela Neves. (2009) industrial symbiosis

Distributive Justice
Vincent Moreau, et al. (2019) Social and Institutional Dimensions Matter for the Circular Economy
Paul Collier: communitarianism

Regenerative Agriculture
Mathieu Dasnois, et al. (2021)



Place-based Circular Transition



Sub research question 1

What resources and potential does north Anhui have in line with the regional circular tranistion?

Analytical Framework

To understand:

WHAT

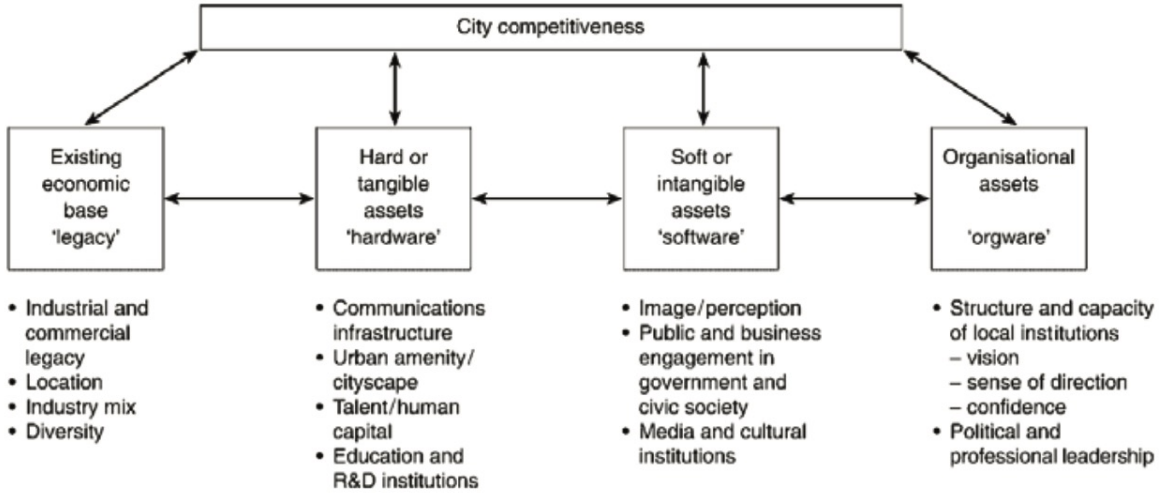
what resource do north Anhui 6 cities each and

collectively have

what challenges they are facing

WHERE

where do these locate



[urban assets bundles - Iain Docherty]

Existing economic base 'legacy'

A major agricultural production area

Suzhou
wheat
corn
soybean
vegetable*
fruit

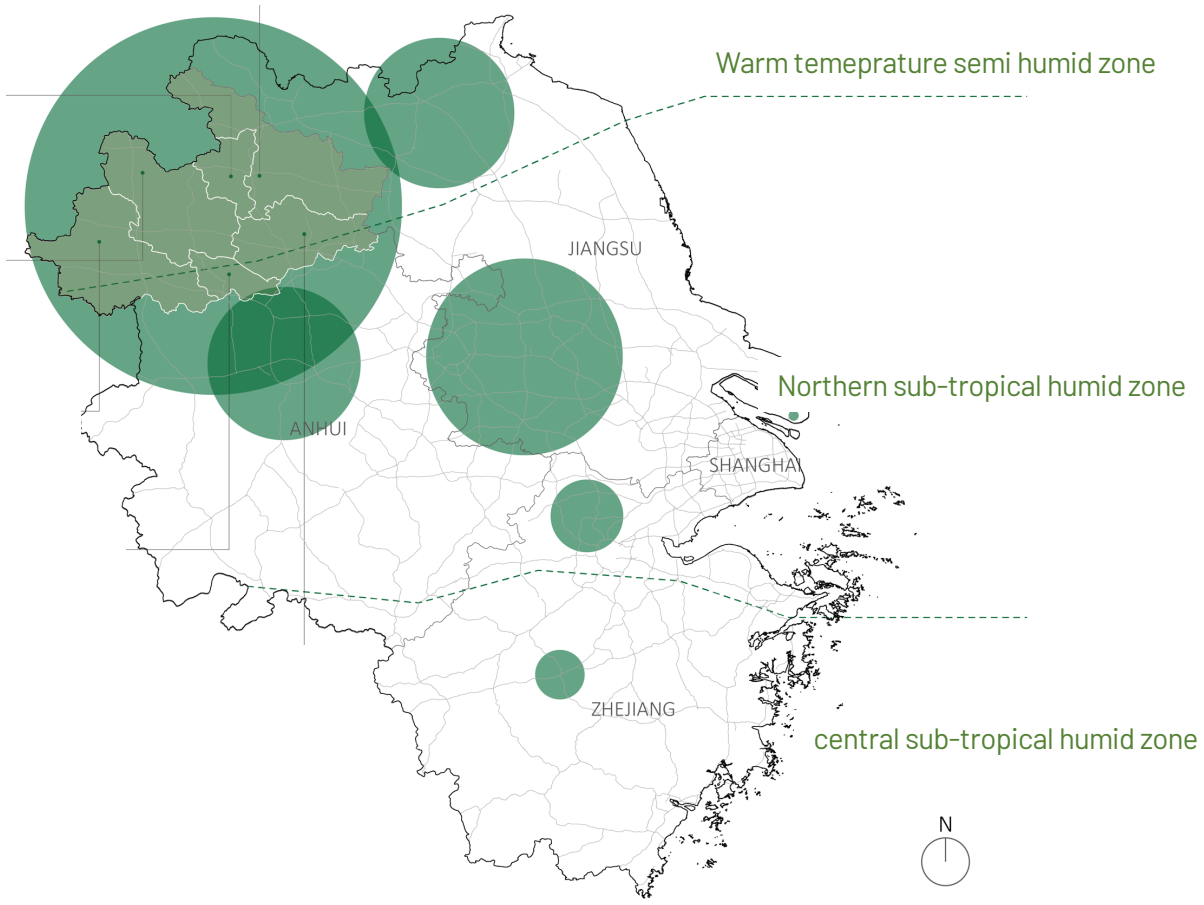
Huaibei
wheat
cotton
soybean
corn
Chinese medicine material
sorghum
vegetable*

Bozhou
wheat
corn
soybean
Chinese medicine material
peanut
vegetable*

FUYANG
wheat
corn
rice
Chinese medicine material
vegetable**

Huainan
rice
wheat
cotton
soybean
peanut
vegetable*

BENGBU
wheat
rice
corn
soy bean
peanut
sweet potato
potato
vegetable*



OF AGRICULTURE YIELD PER MAIN PRODUCTION ZONE

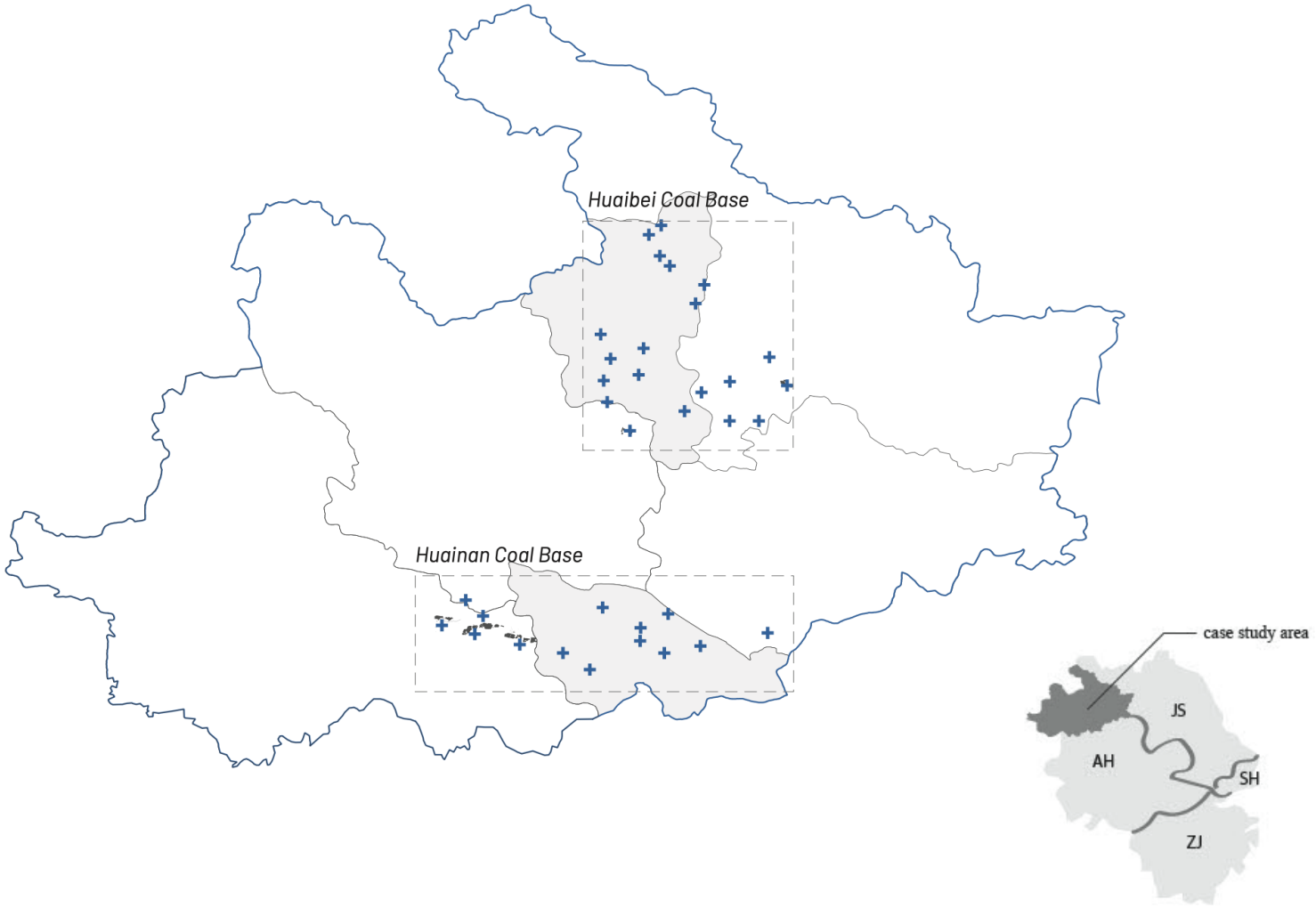
data source: Baidu API, national bureau of statistics 2021

Existing economic base ‘legacy’

One of the major coal bases in China

fig 6.4 Huainan Mining Group Xinzhuangzhi Coal Mine
source: baidu baike

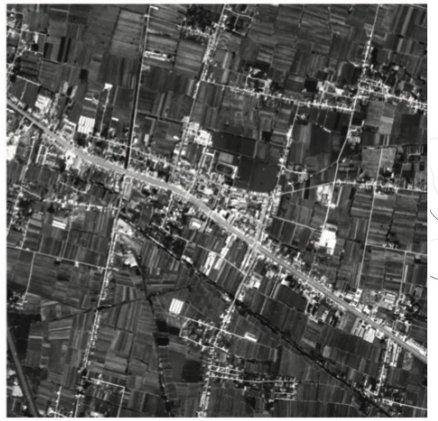
fig 6.5 Image of Coal Mine Workers off work
source: baidu baike



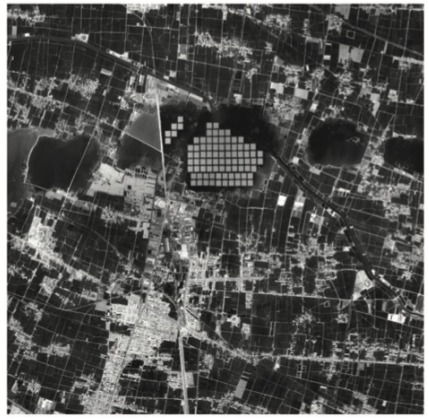
Hard or tangible assets ‘hardware’ cityscape

Built Environment Typology

CO-OP INDUSTRIAL PARKS

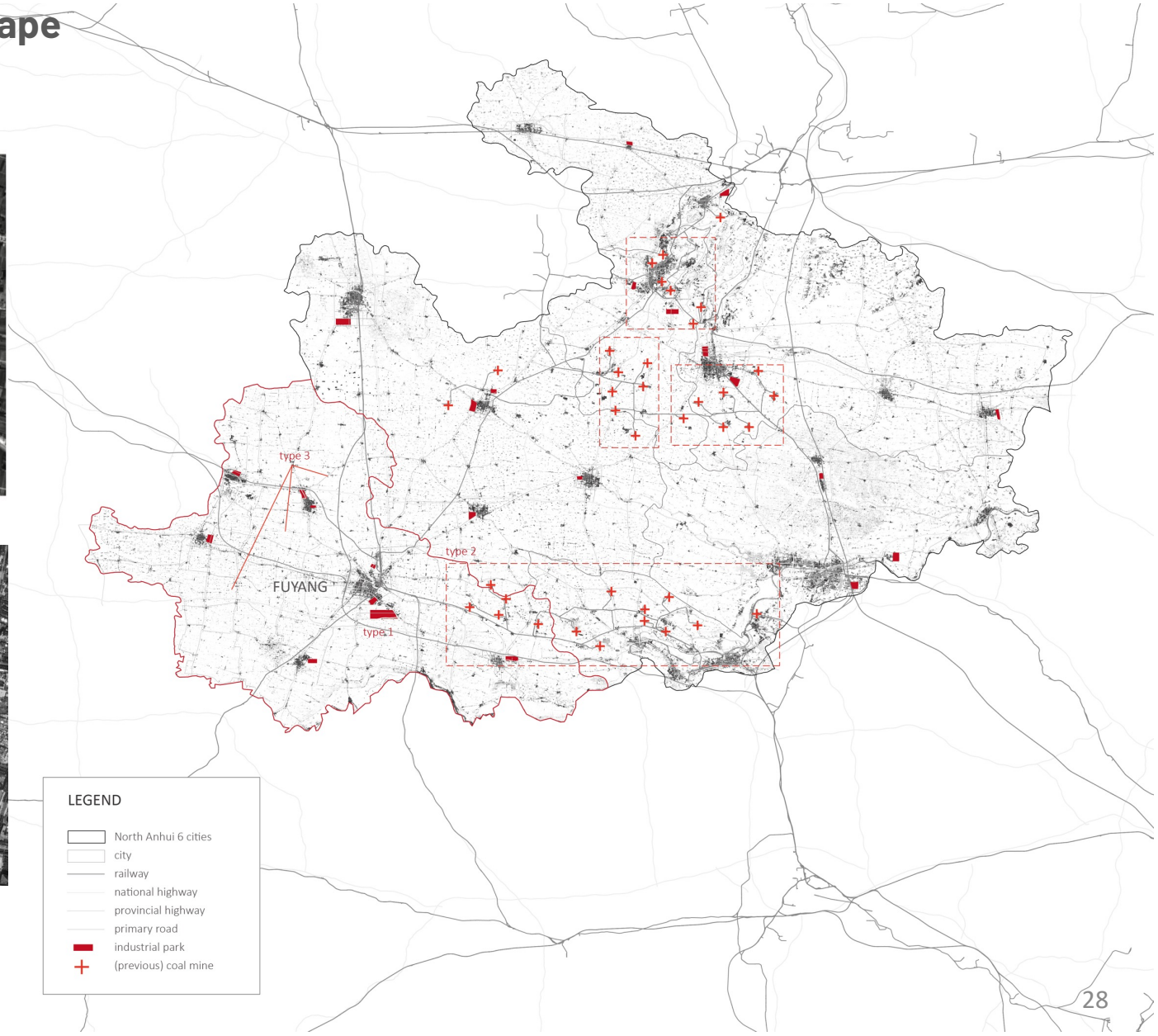


RURAL INDUSTRY



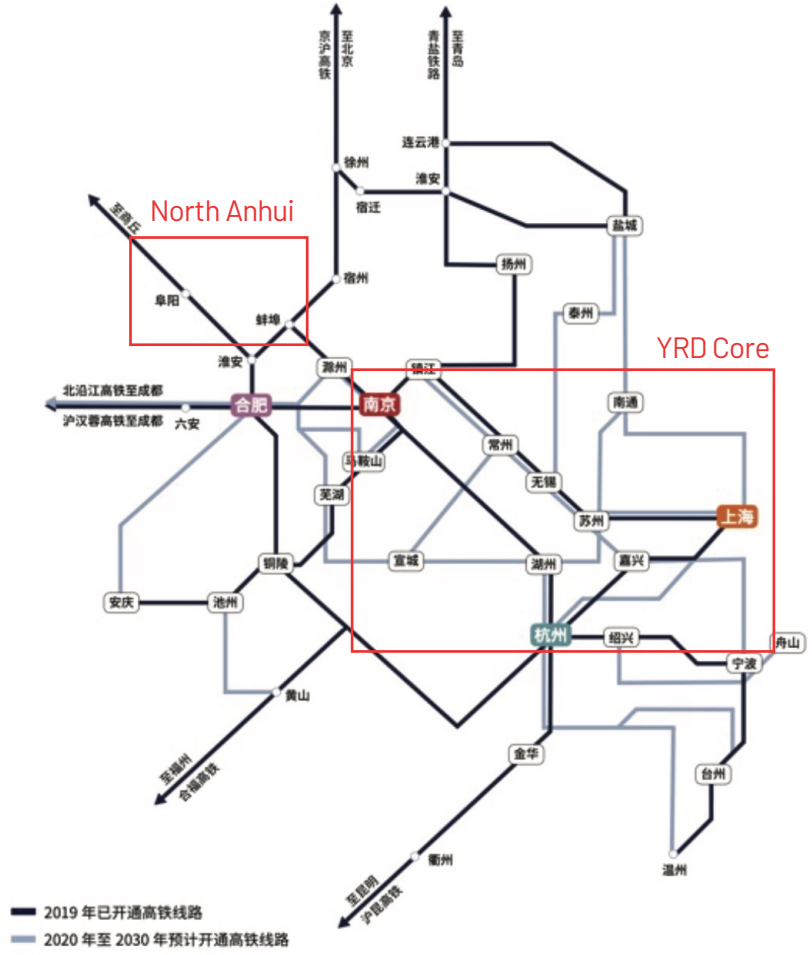
PREVIOUS COAL MINES

HIGH DENSITY URBAN CORE



Hard or tangible assets 'hardware' communication infrastructure

Connection with YRD core
Fuyang as regional transportation hub



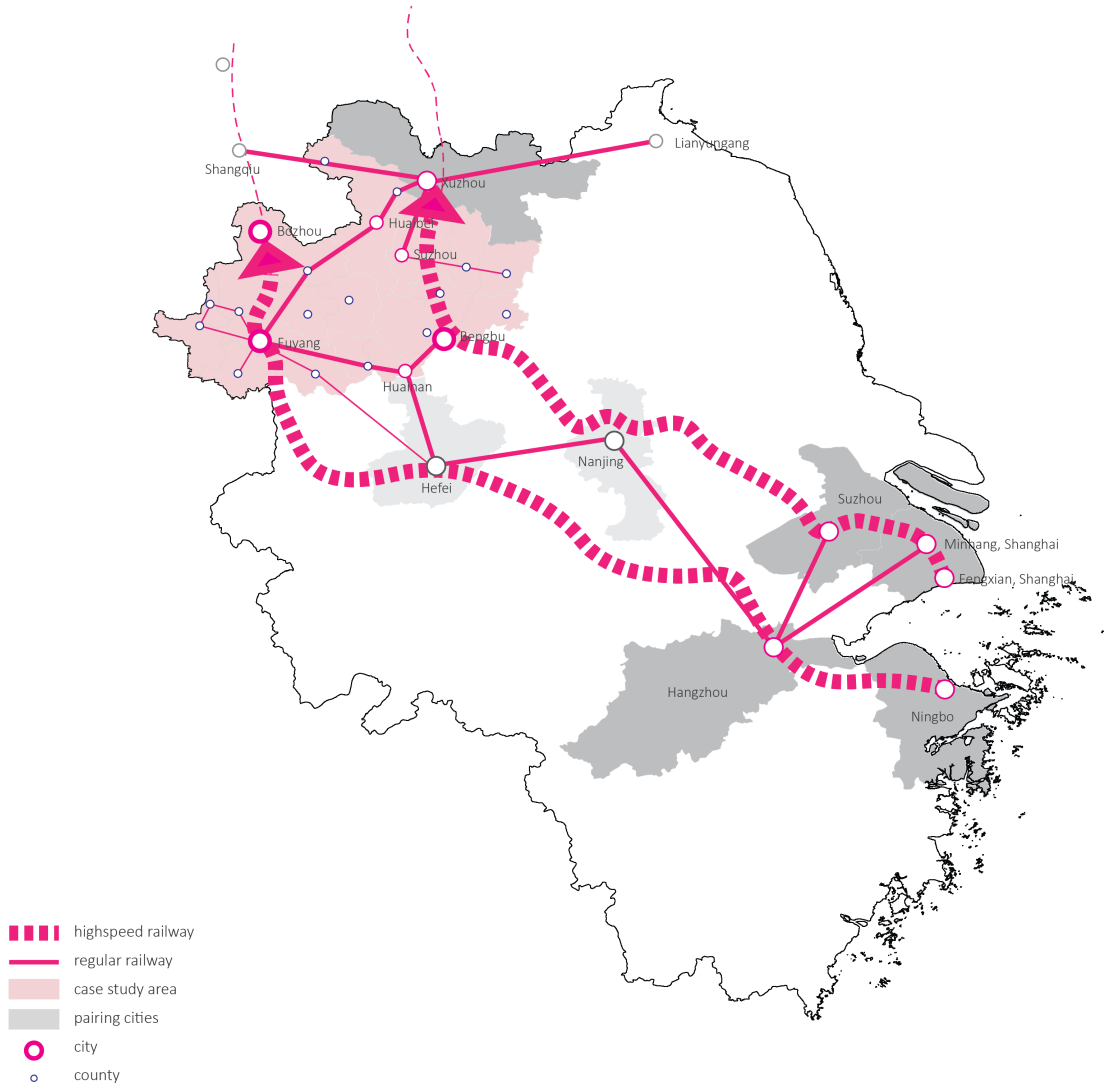
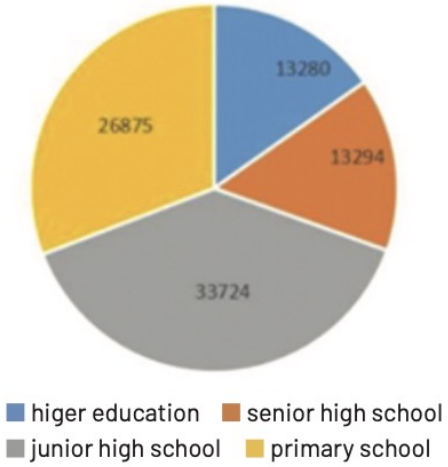


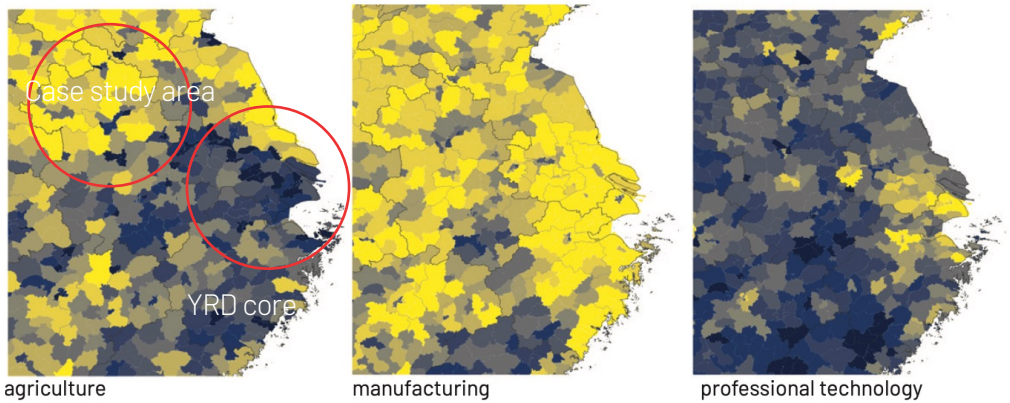
fig 6.14 YRD highspeed railway planning
Source: Cushman & Wakefiled

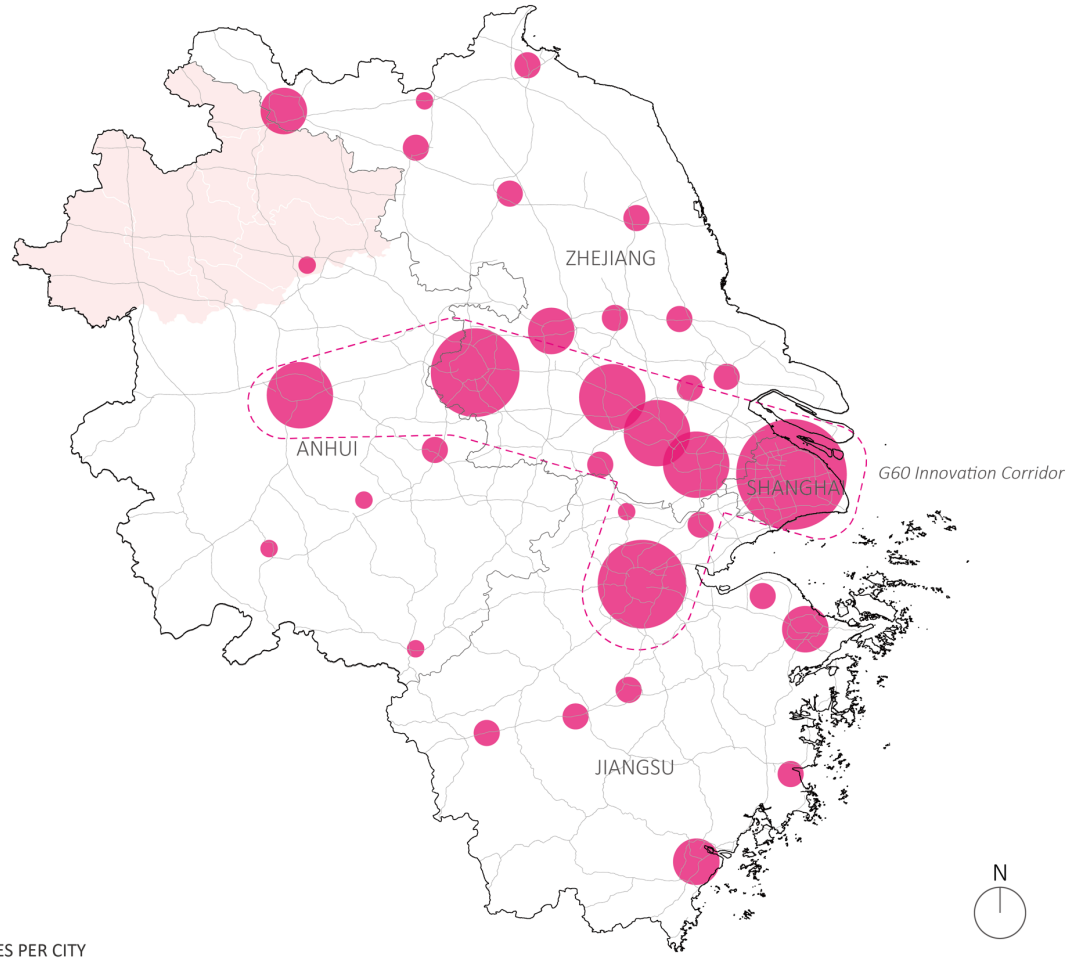
Soft assets ‘software’ | talent & human capital

Low education status



Population density by industry





data source: Baidu API

Organizational assets ‘orgware’

YRD Integrated Development Scheme & Dual Carbon Scheme

Yangtze River Delta Integrated Development Plan

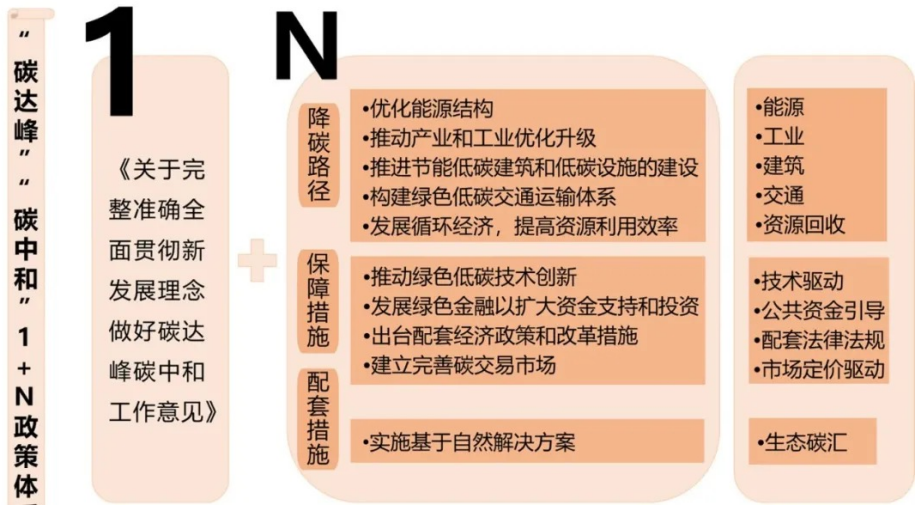
中华人民共和国国家发展和改革委员会
National Development and Reform Commission

- Specific measures
- Public Government
- Enterprise
- Government collaboration
- Ecological Environment
- Transportation
  - Railroads
  - Roads
  - Air
  - Cross-Provincial Public Transportation
  - Ticket Card Interchange
- Health Care
- Education
- Tourism
- Science and Technology Innovation
- Culture and Sports Exchange
- Housing

Dual Carbon Program (3060 program)

STATE COUNCIL 国务院

- Carbon peaking by 2030
- carbon neutrality by 2060



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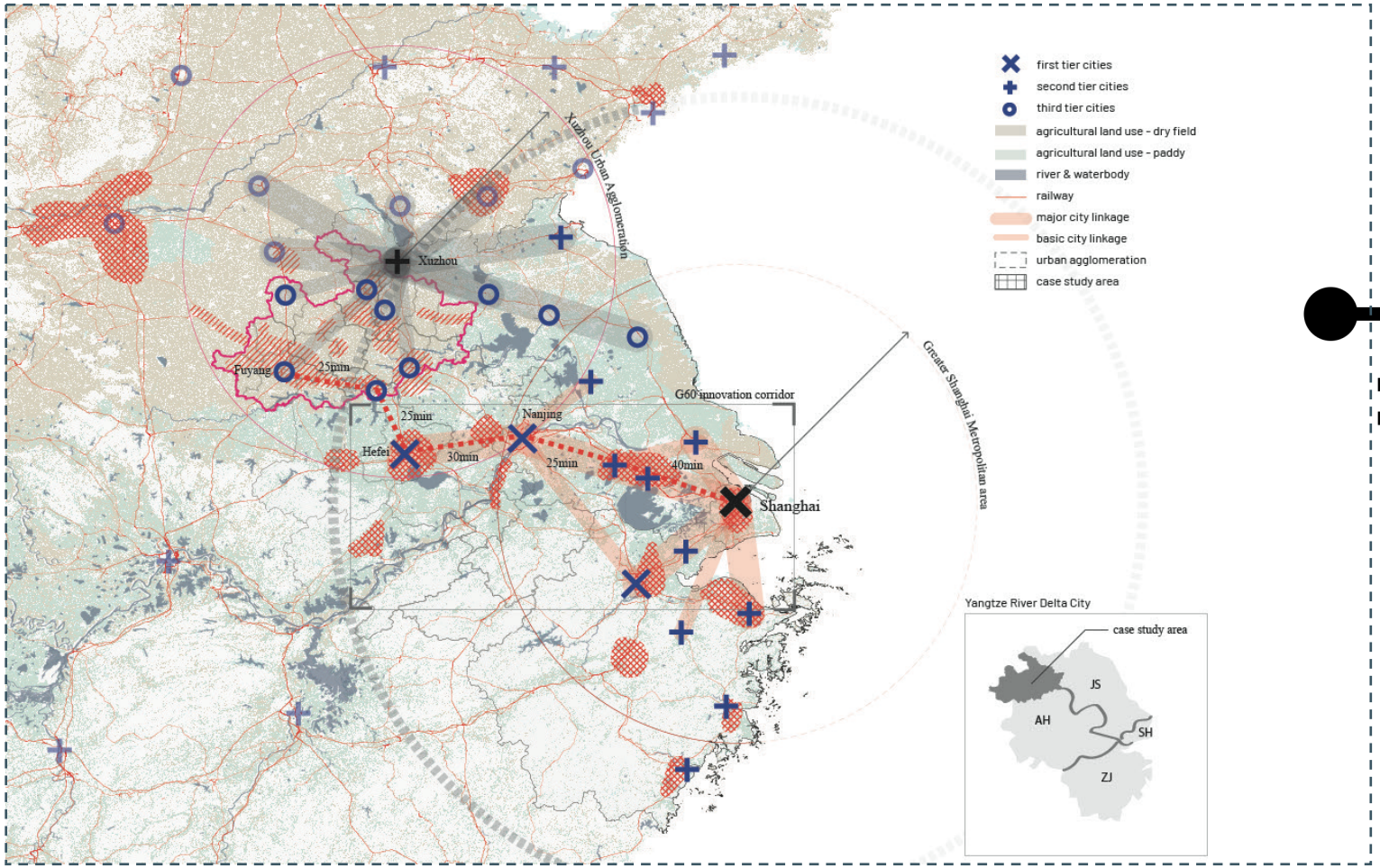
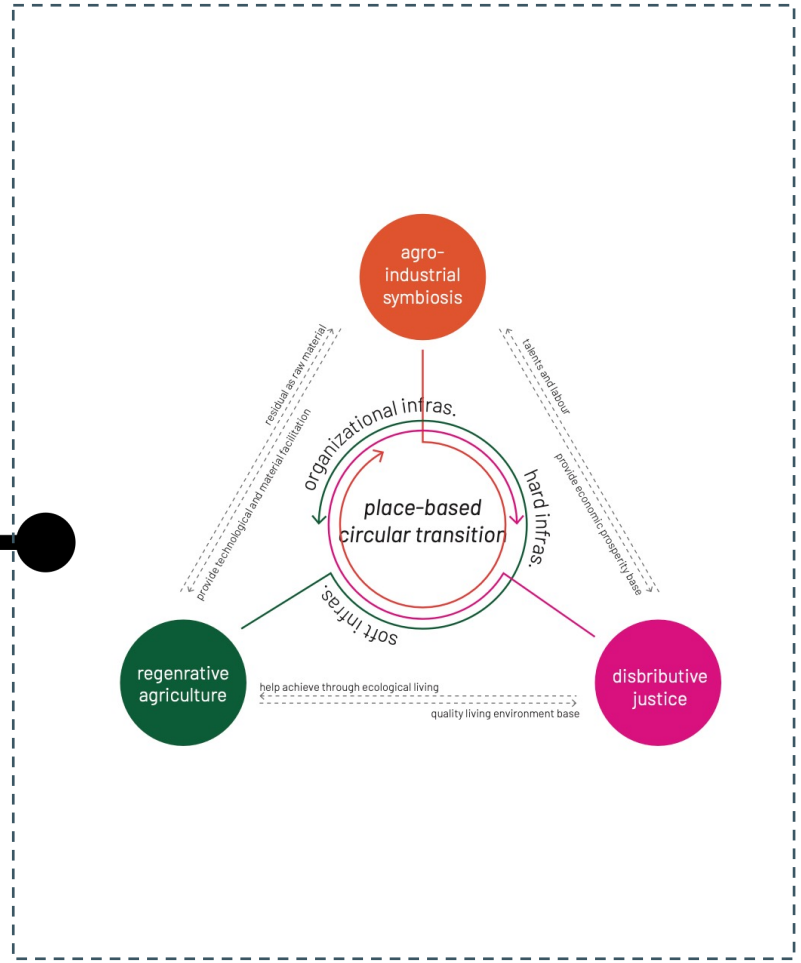




Current Situation

Circular Transition

Sub research question 2

What regional spatial planning and governance strategy are needed to steer regional circular transition?

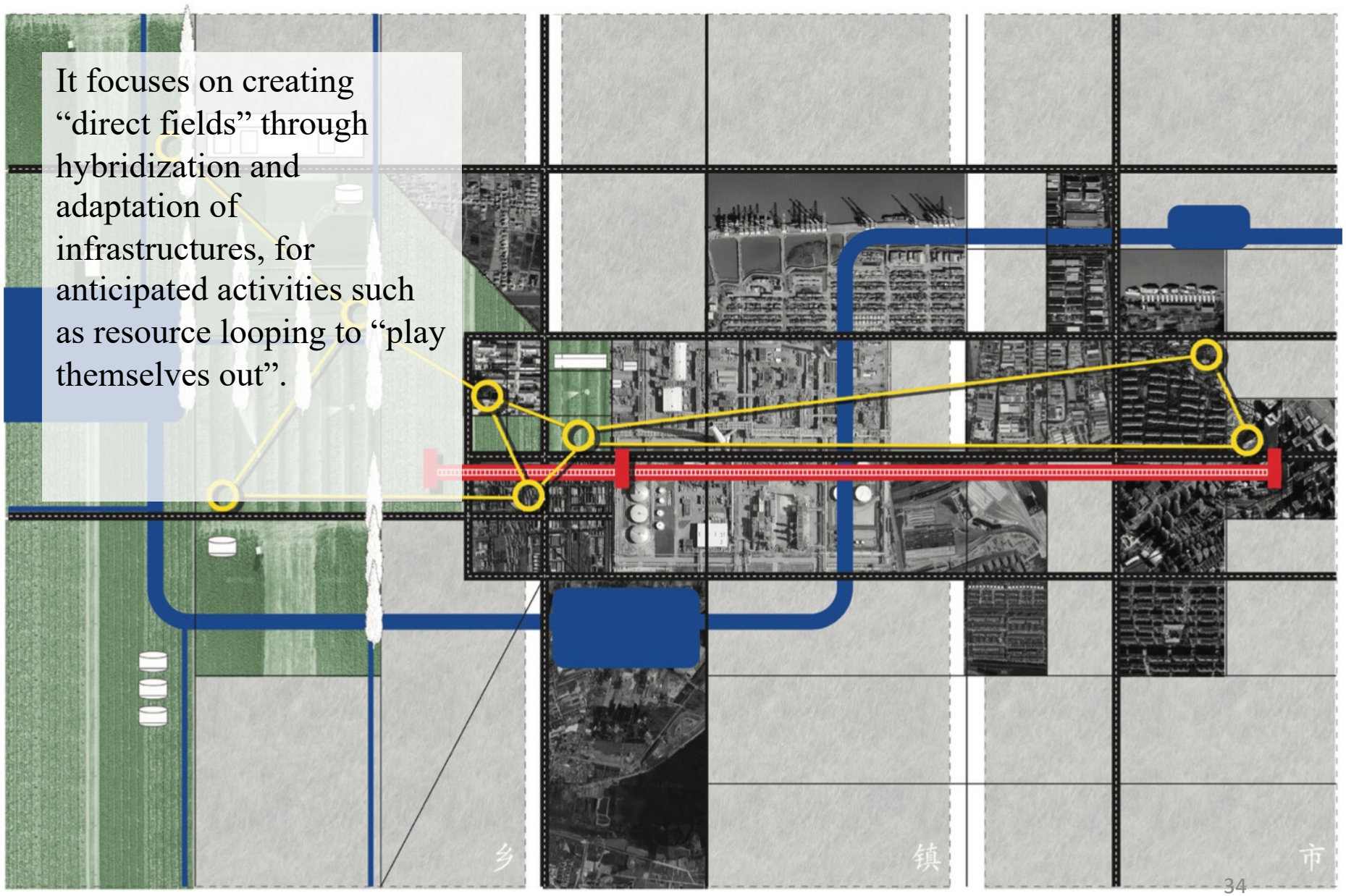
Infrastructural Circularity

[as direction]
Jo Williams (2019)
Three pillars of circular transition
- Resource looping
- Ecology regeneration
- Adaptation

[as operation]
Stan Allen (1999)
Infrastructural urbanism
- System oriented
- Incremental design

▶ **[Infrastructural circularity in a region]**

Soft infrastructure
Hard infrastructure (railway, highway, blue and green system)



Three types of infrastructure

- **Soft infrastructure**

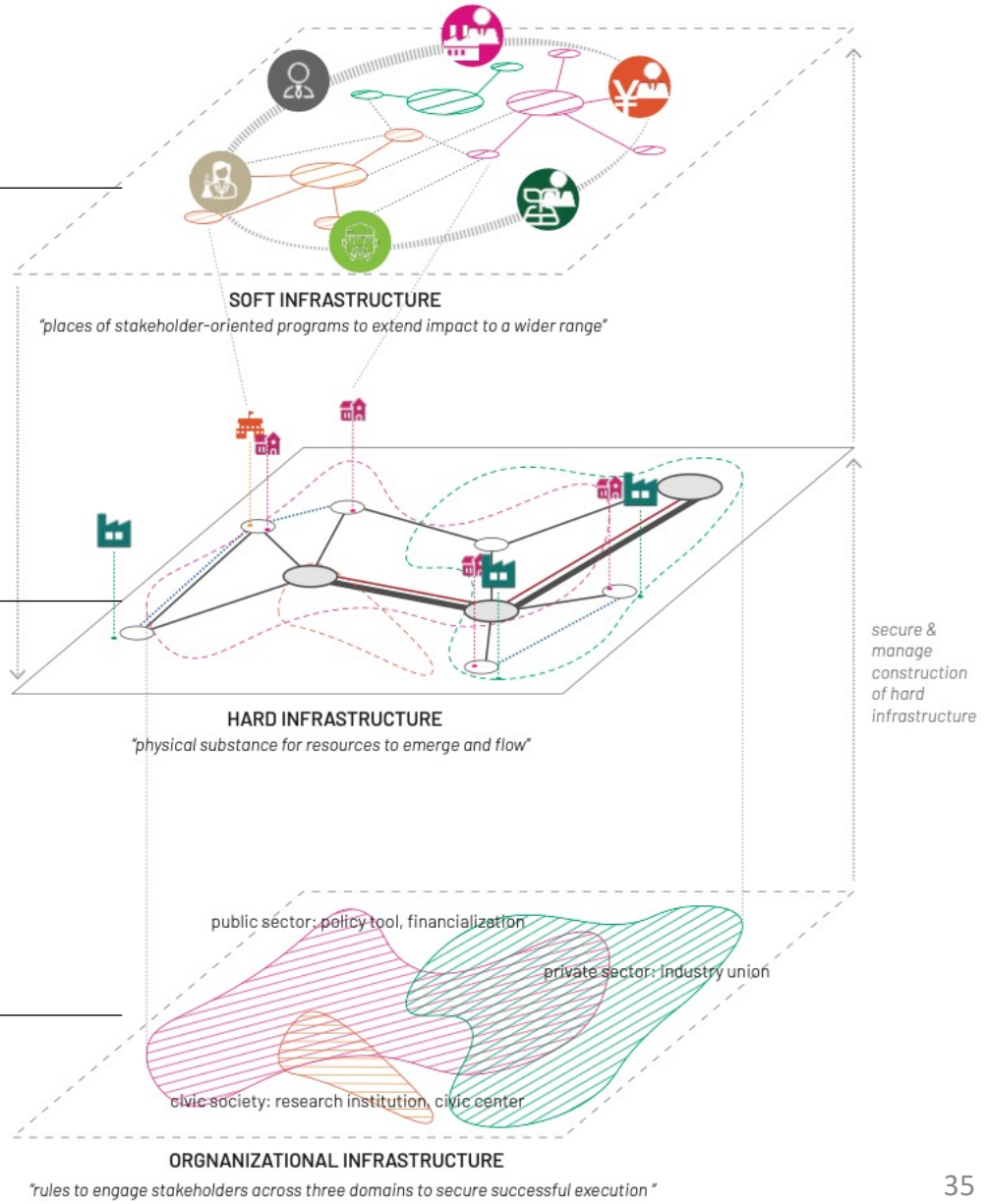
"places to hold stakeholder-oriented programs to extend the impact to wider range "

- **Hard infrastructure**

"physical substance for resources to emerge and flow"

- **Orgniazational infrastructure**

"governance design to engage stakeholders to secure a successful transition"



So, what does north Anhui need?

VISION STATEMENT

VISION STATEMENT

"TOWARDS
A THRIVING
PERIPHERY

THROUGH
PLACE-BASED
CIRCULAR TRANSITION"

DEVELOPMENT PRINCIPLES

PROSPERITY

A thriving and virtuous cycle of economic activity in the case study area leads to value growth and provides sufficient capital to support quality development.

LIVABILITY

Pollution control, more greening and activity space, and improved living environment. Create a high-quality living environment so that people want to stay.

SUSTAINABILITY

To build a circular economy system, including the use of clean energy to replace traditional thermal power generation, increase the recycling of agricultural residuals, and at the same time regenerate the local ecological system.

SOCIAL JUSTICE

Guarantee a people-oriented reciprocal decision-making process with an organic combination of top-down and bottom-up to achieve fair spatial justice of distribution of amenity and development result.

GOALS & STRATEGIC OBJECTIVES

GOAL 1 Connect for Opportunity
strengthen regional connectivity and improve logistic efficiency

1.1 optimize existing transportation infrastructure to align with the development zone and needed connection
1.2 hybridization: connect adjacent transportation points for higher efficient transportation network

GOAL 2 Go Circular and Extend
catalyze synergetic development of local agriculture and industry

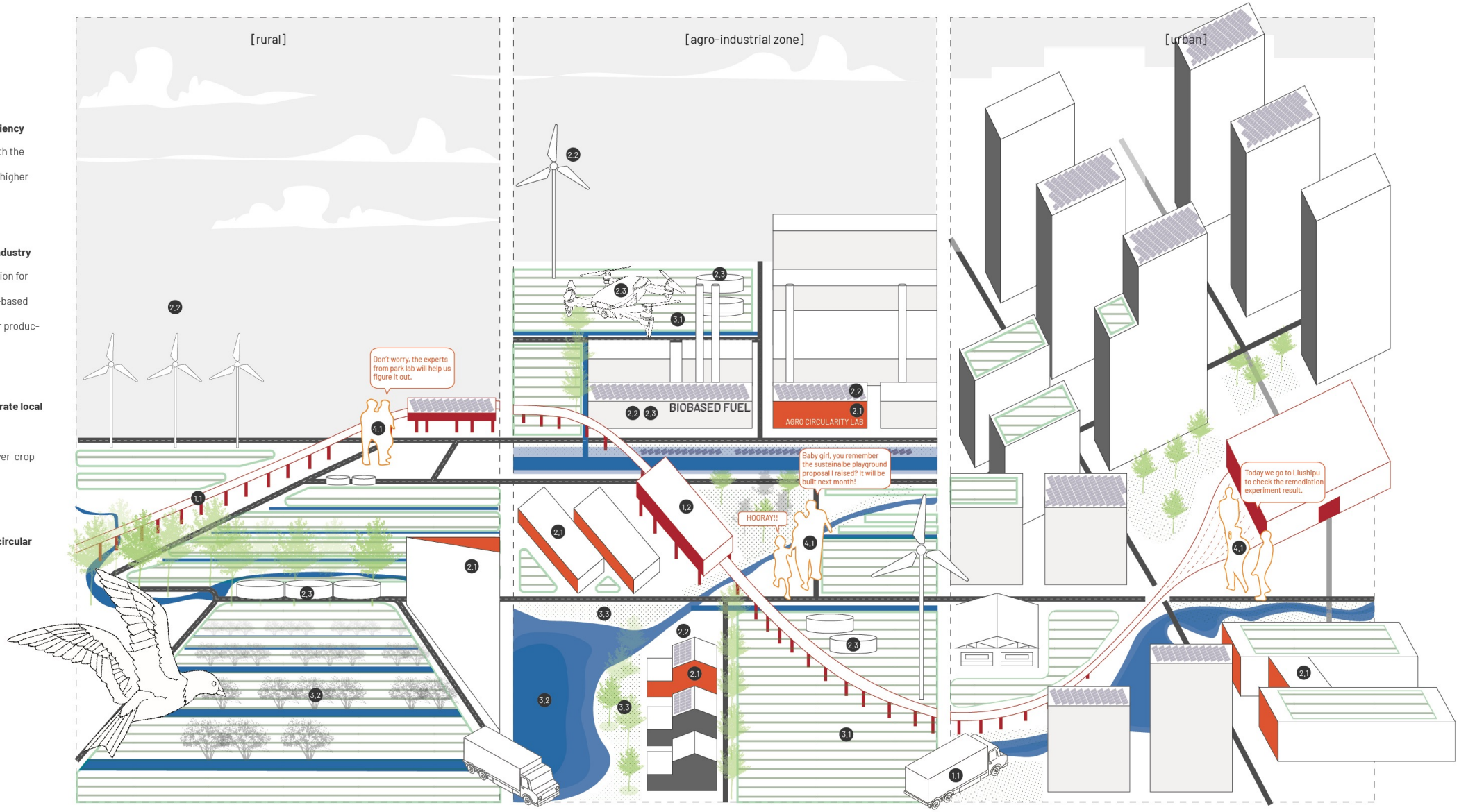
2.1 establish multi-scalar innovation collaboration as foundation for place-based circular transition
2.2 Support the phasing out of coal mine industry with place-based agriculture-integrated methods
2.3 Complete agriculture production value chain with circular production infrastructure

GOAL 3 Produce while Regenerating
production activities as opportunities to repair and regenerate local eco-system

3.1 consolidate and scale up agriculture production
3.2 purfiy polluted soil through a multi-method approach (cover-crop and mine-pit resolution)
3.3 improve waterfront ecologic sustainability

GOAL 4 Start Here, Start Together
communitarian governance for realization of place-based circular transition in rural periphery

4.1 initiate development momentum at local level
4.2 establish multi-scalar coordination



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Provide foundation

GOAL 1 Connect for Opportunity

strengthen regional connectivity and improve logistic efficiency

1.1 optimize existing transportation infrastructure to align with the development zone and needed connection
1.2 hybridization: connect adjacent transportation points for higher efficient transportation network

Secure the feasibility

GOAL 4 Start Here, Start Together

communitarian governance for realization of place-based circular transition in rural periphery

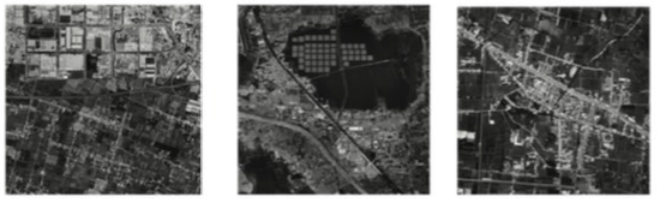
4.1 initiate development momentum at local level
4.2 establish multi-scalar coordination

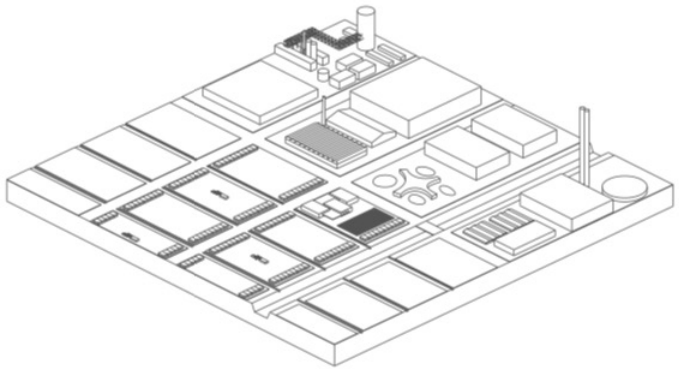
SCALE OF DESIGN

YRD
Yangtze River Delta

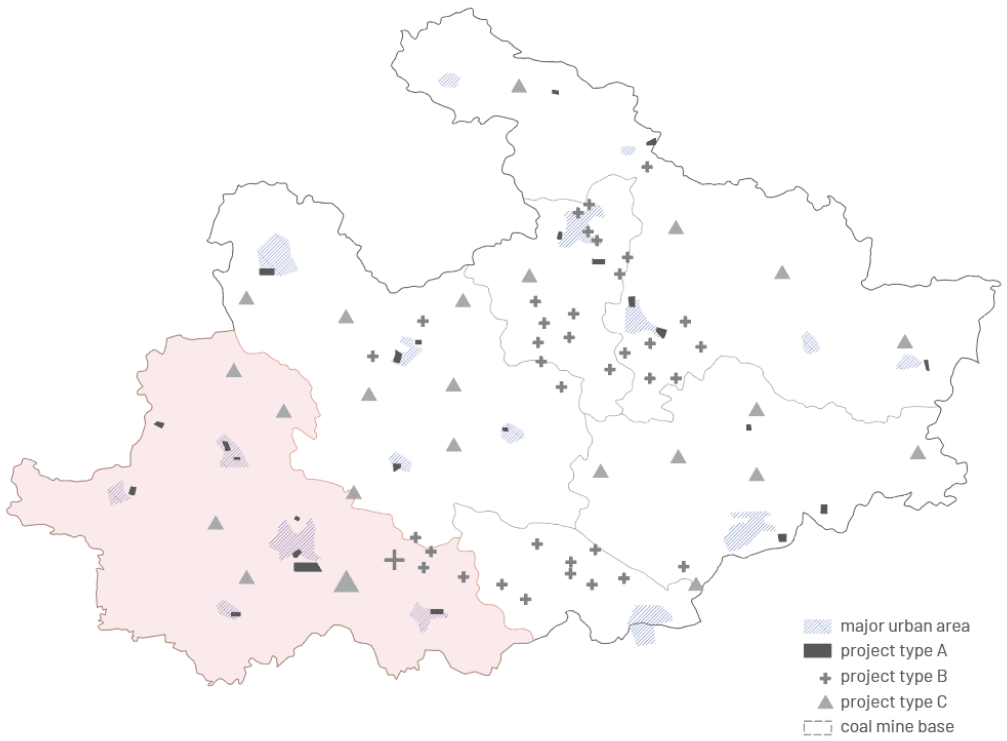
NA
North Anhui area

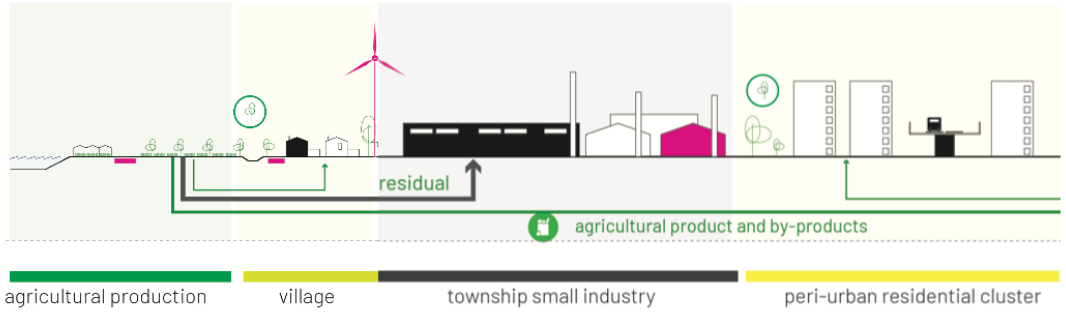
PT - x
Project Area



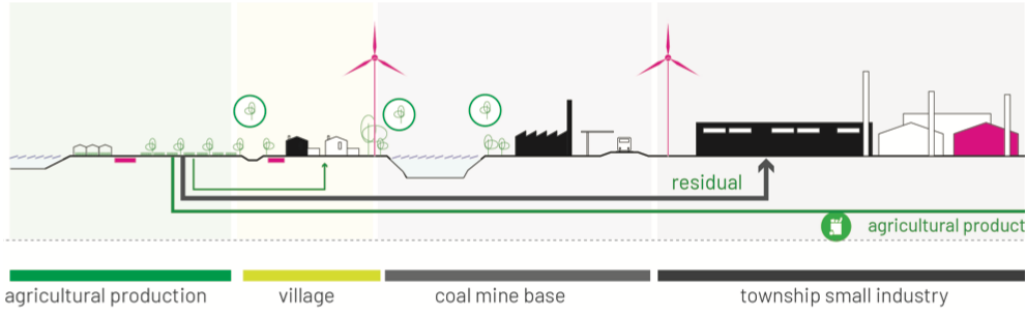


Three Types of Project Area

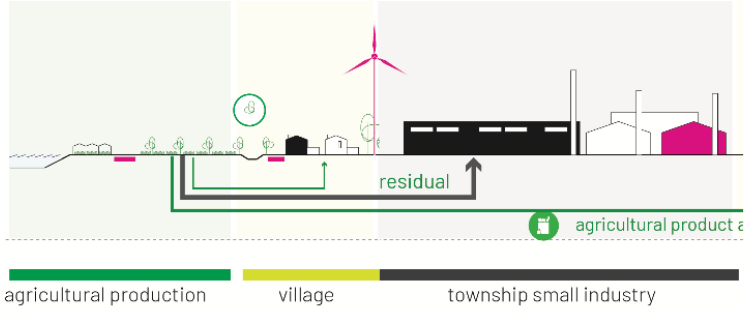




[project type - A]



[project type - B]



[project type - C]

GOAL 1

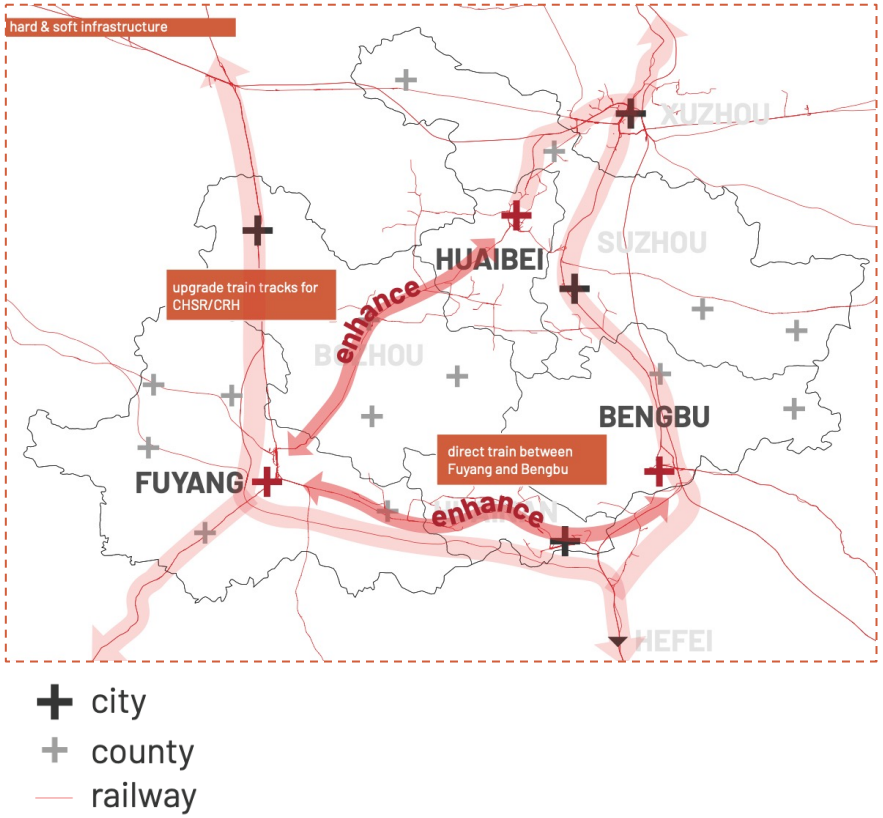
Connect for Opportunity

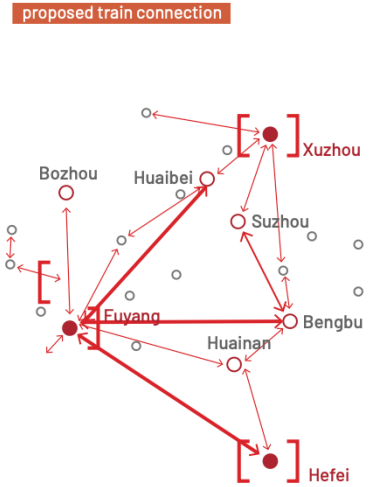
strengthen regional connectivity and improve logistic efficiency

North Anhui | Project

Strategic Objective 1.1 **Optimize existing transportation infrastructure to align with the development goal**

1.1.1 Add up train connection between Fuyang-Bengbu and upgrade railway tracks between Fuyang-Huaibei



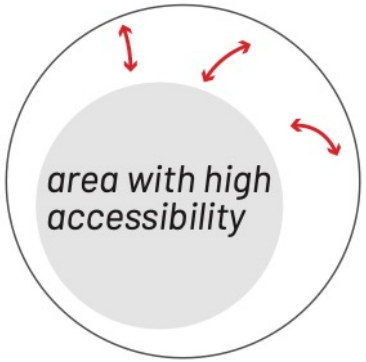


	CHSR*	CRH**	direct	extra fast	fast	total	time(least)
Fuyang - Bozhou	31		1		11	43	00:26
Fuyang - Huainan	40	1			14	55	00:33
Huainan - Bengbu	12				2	14	00:17
Fuyang -Bengbu	10				5	15	00:40 ***
Fuyang - Huaibei	10				5	15	00:15 ***
Huaibei - Xuzhou	16				7	23	00:34
Xuzhou - Suzhou	53			3	6	64	00:18
Suzhou - Bengbu	40			3	9	54	00:23
Huainan - Hefei	60	1			12	73	00:27
Fuyang - Hefei	69	2	1	1	16	89	01:02

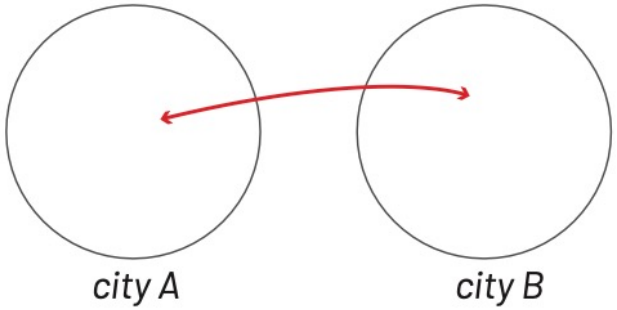
*CHSR: China High-speed Railway c.a.300km/h
**CRH: China Railway High-speed c.a.200km/h
*** estimated time

Strategic Objective 1.1 **Optimize existing transportation infrastructure to align with the development goal**

1.1.2 improve accessibilitywith public transportation within and across city border



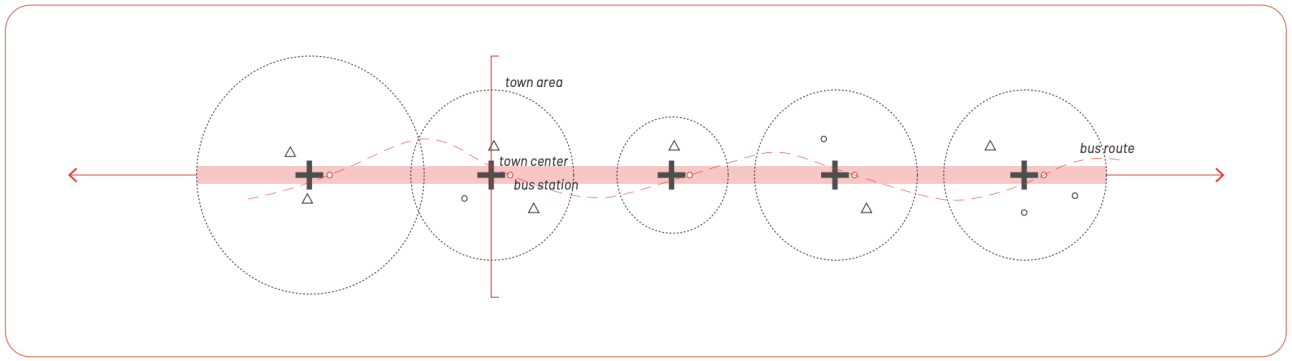
TYPE 1
in-city bus line optimization



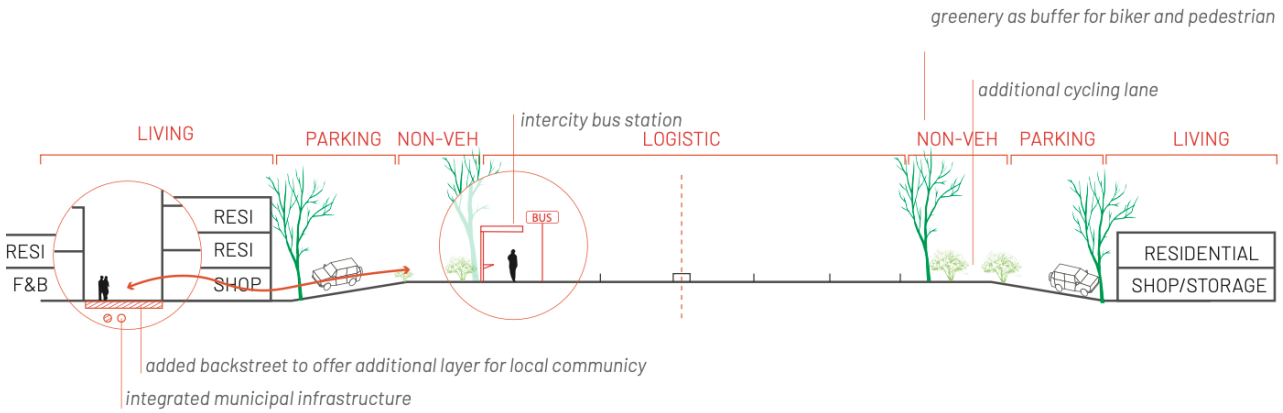
TYPE 2
cross-border bus line optimization

Strategic Objective 1.1 **Optimize existing transportation infrastructure to align with the development goal**

1.1.3 upgrade high connectivity highways through section design

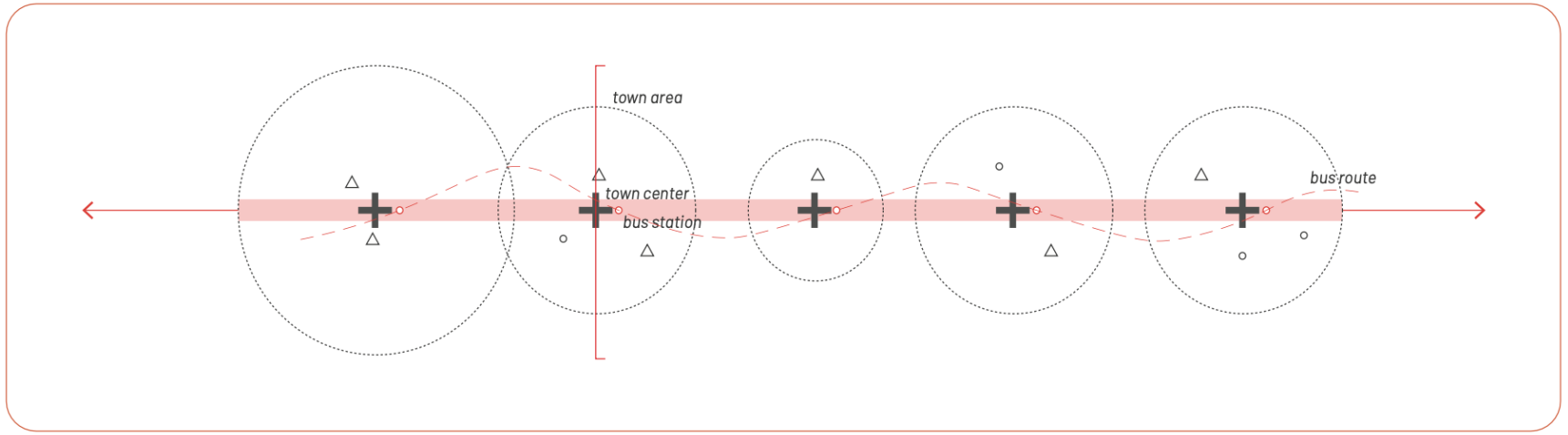


[highway with highest angular choice]



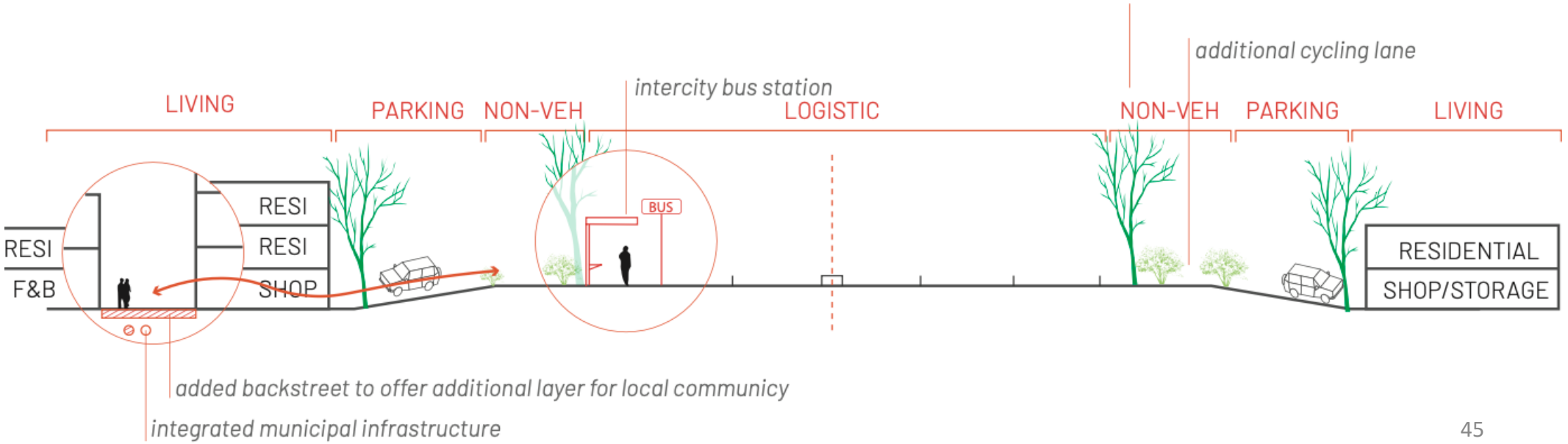
Strategic Objective 1.1 **Optimize existing transportation infrastructure to align with the development goal**

city
county
railway connection
highway to enhance



[highway with highest angular choice]

greenery as buffer for biker and pedestrian

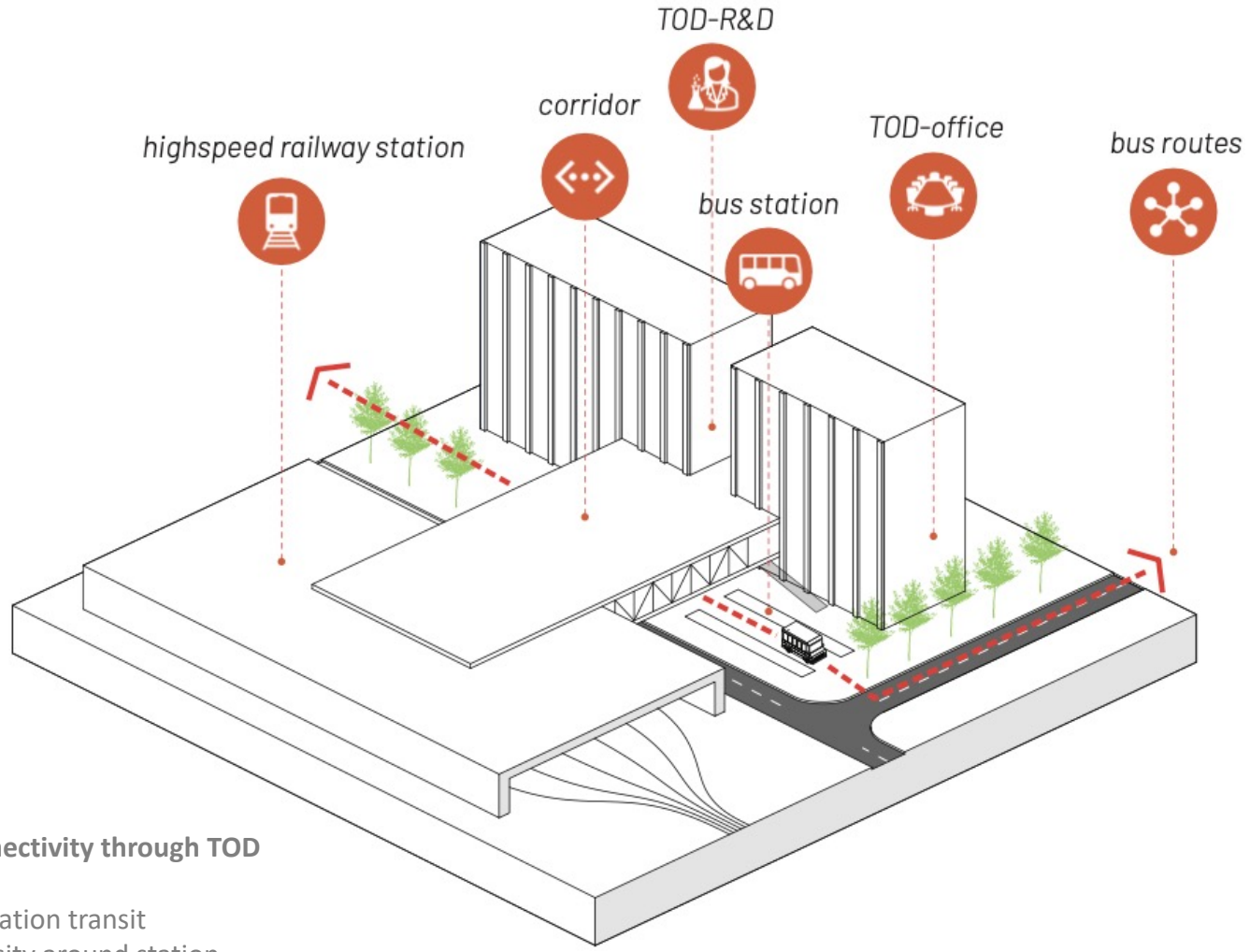


added backstreet to offer additional layer for local communicy

integrated municipal infrastructure

SO 1.2 **Hybridization: connect adjacent transportation points for higher efficient transportation network**

1.2.1 railway + bus + business: TOD development

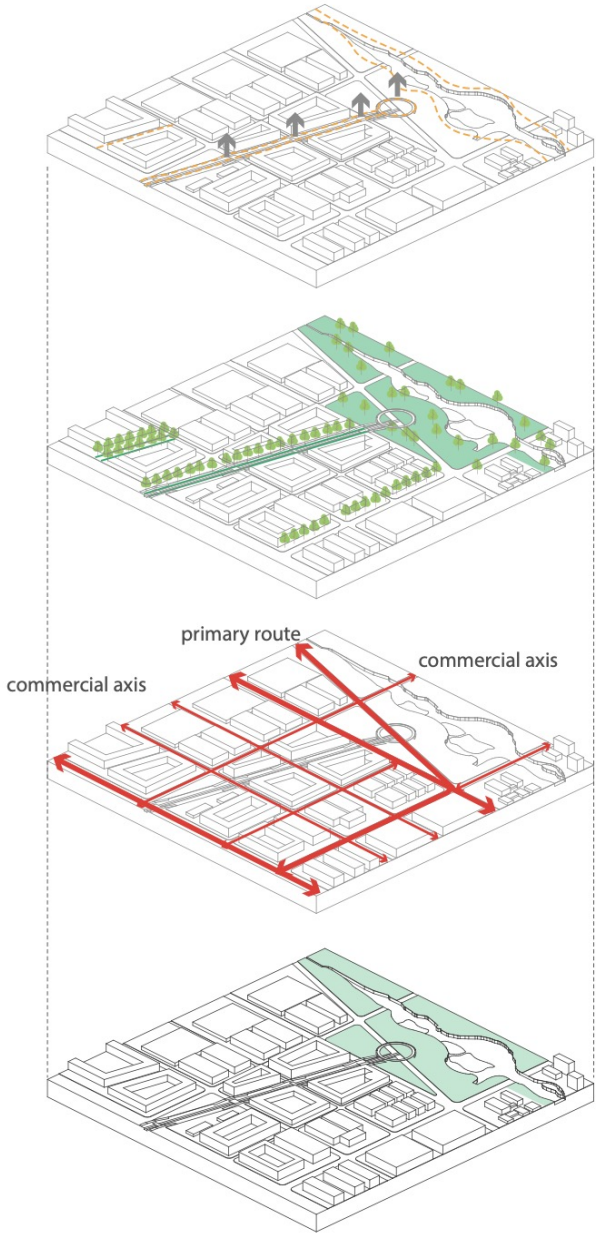


Extend connectivity through TOD

- Corridor
- Transportation transit
- High-density around station

SO 1.2 **Hybridization: connect adjacent transportation points for higher efficient transportation network**

1.2.2 road + blue + green: intertwine and weave road and water system through urban design to offer quality open space and efficient amenity spatial distribution



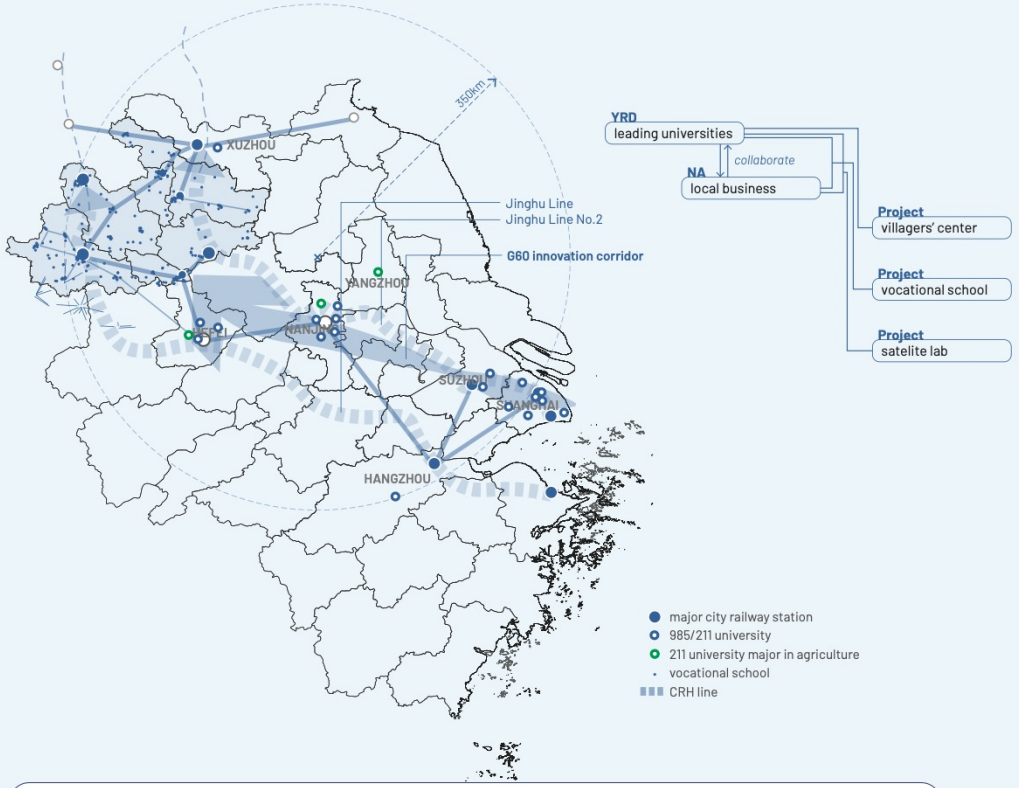
GOAL 2

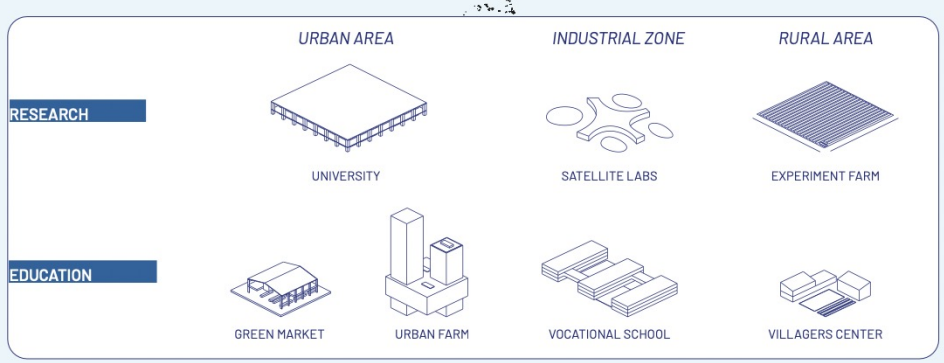
Go Circular and Extend

catalyze synergetic development of local agriculture and industry

Yangtze River Delta | North Anhui | Project Area

SO 2.1 **Establish multi-scalar innovation collaboration as foundation for place-based circular transition**

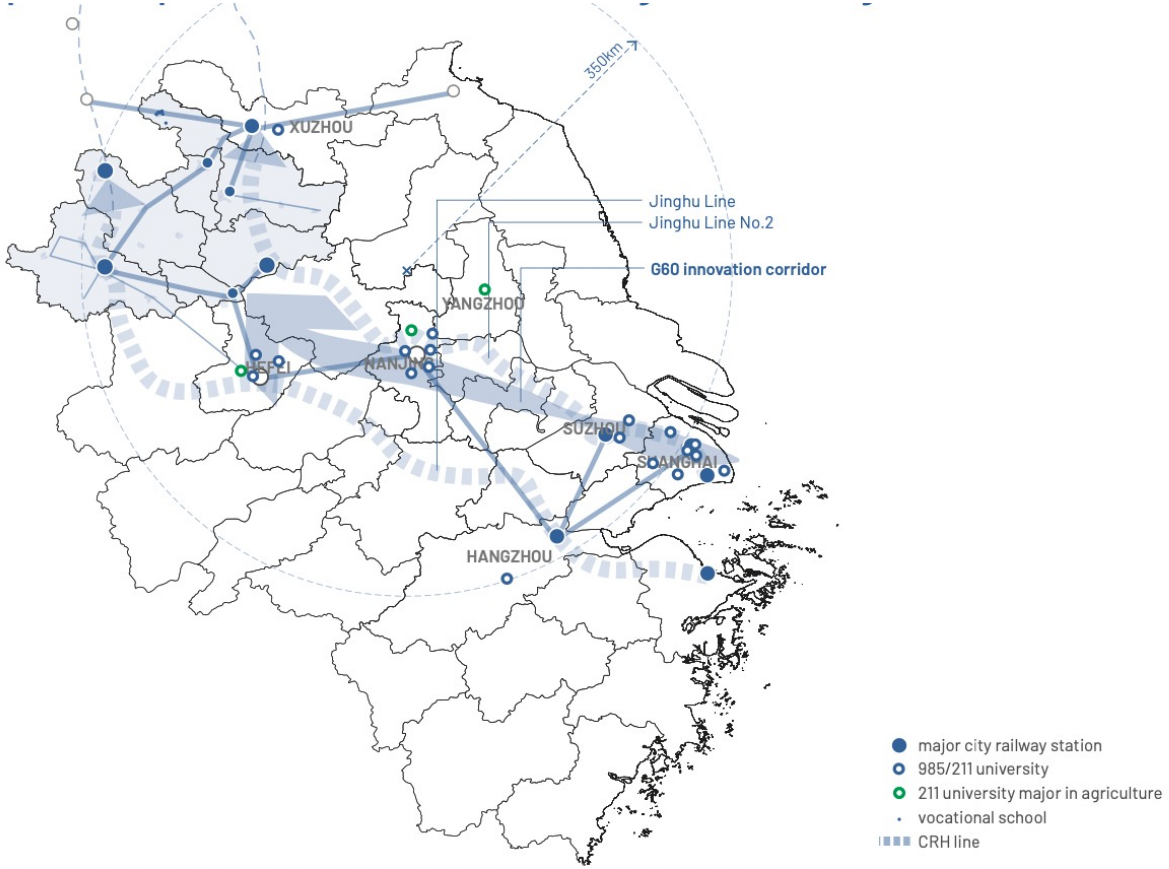


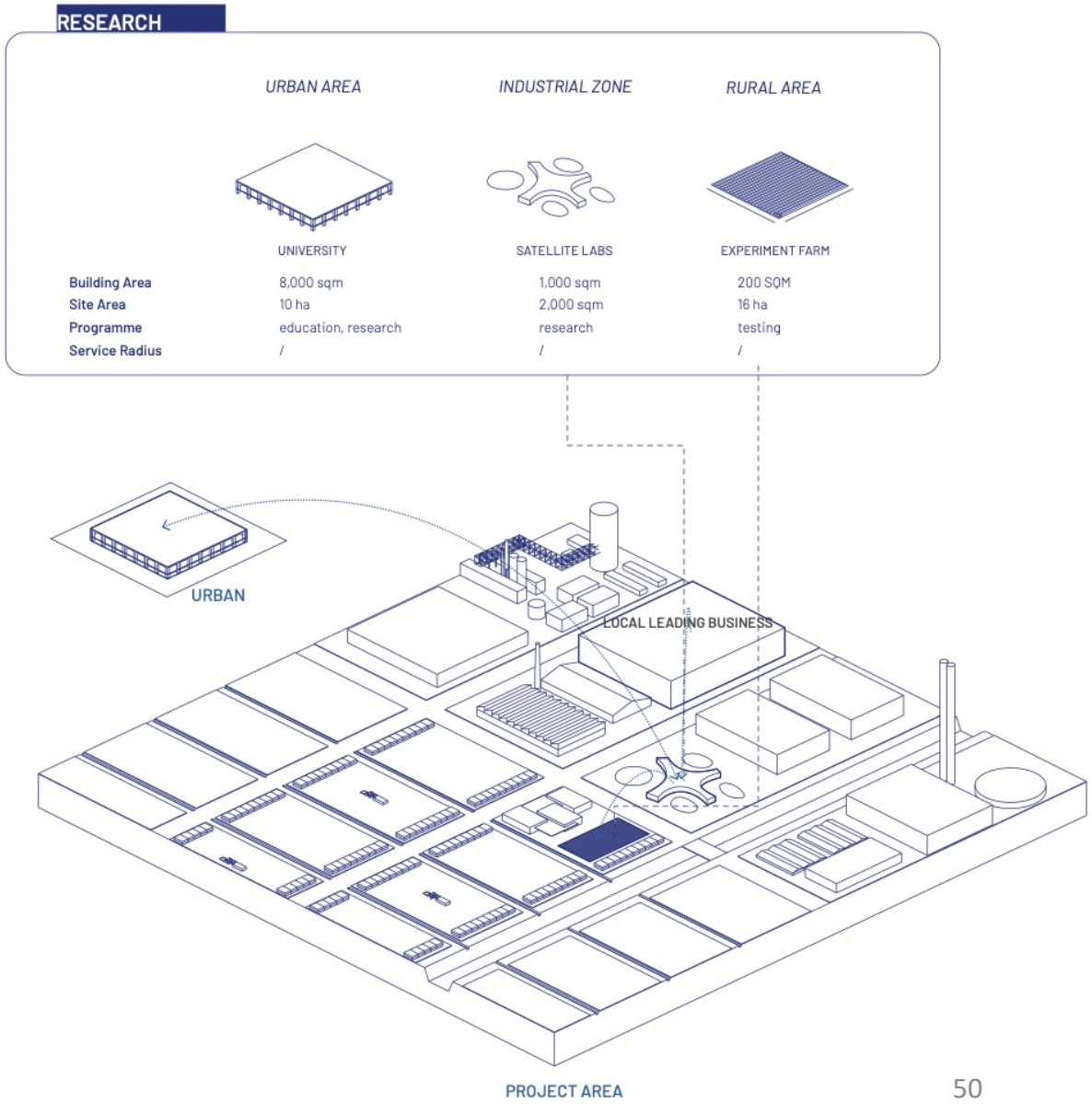


SO 2.1 **Establish multi-scalar innovation collaboration as foundation for place-based circular transition**

2.1.1 RESEARCH: Establish research league of circularity transition

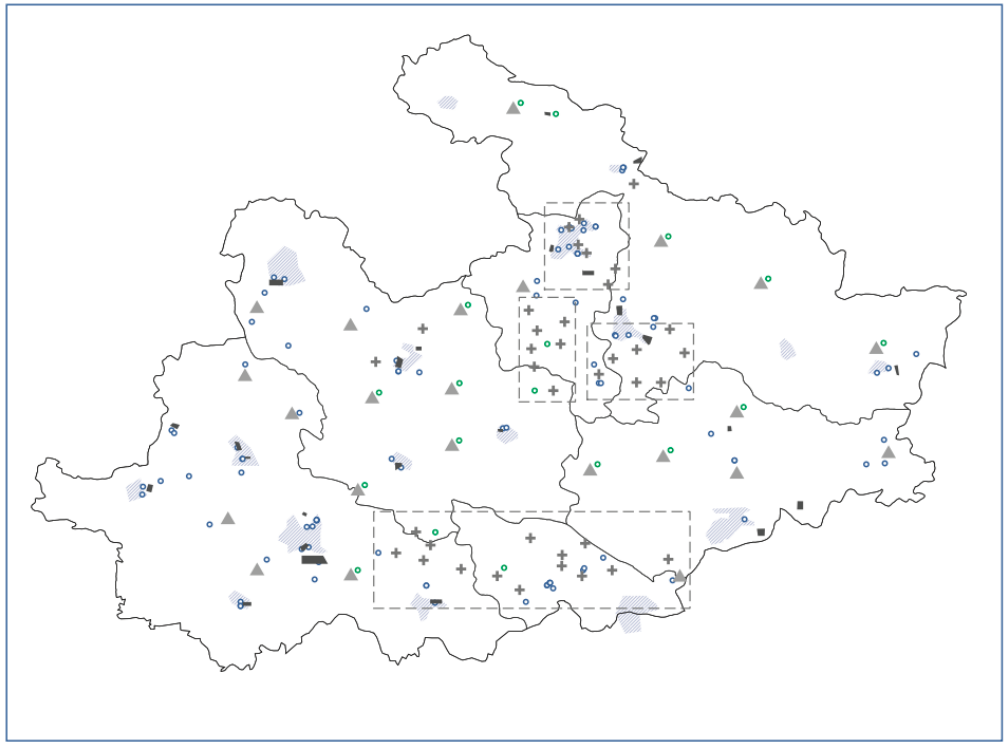
Building satellite labs in NA with support from top universities in core YRD, collaborating with local leading businesses



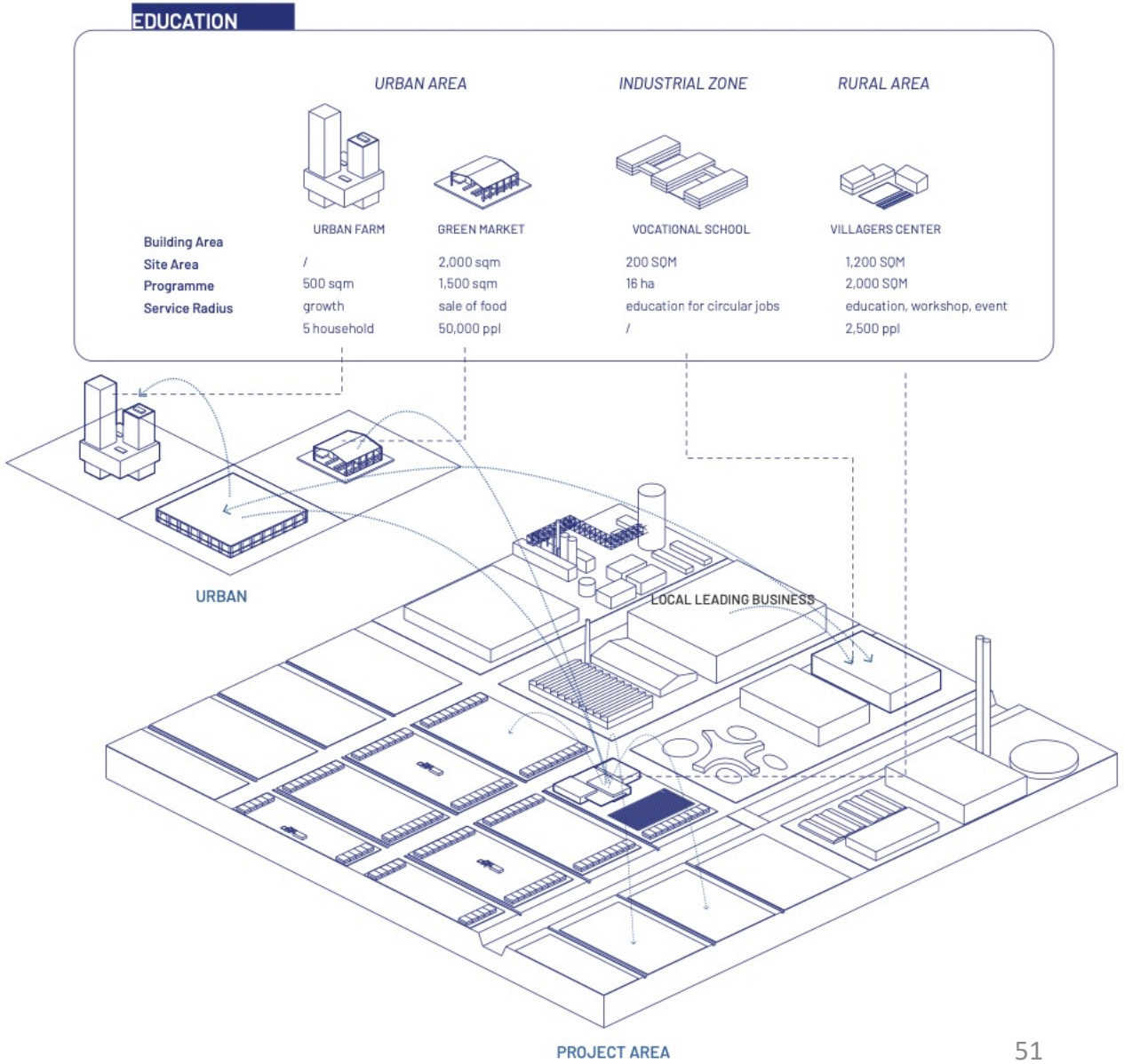


SO 2.1 **Establish multi-scalar innovation collaboration as foundation for place-based circular transition**

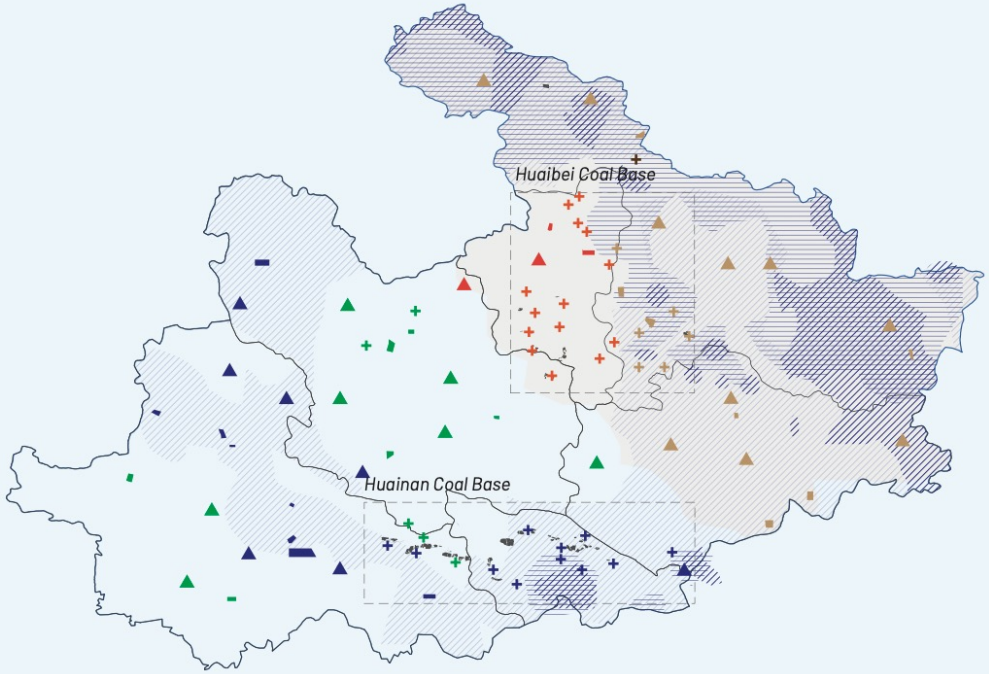
2.1.2 EDUCATION: set up knowledge center in local villages, support vocational school launch courses to prepare labour for circular economy

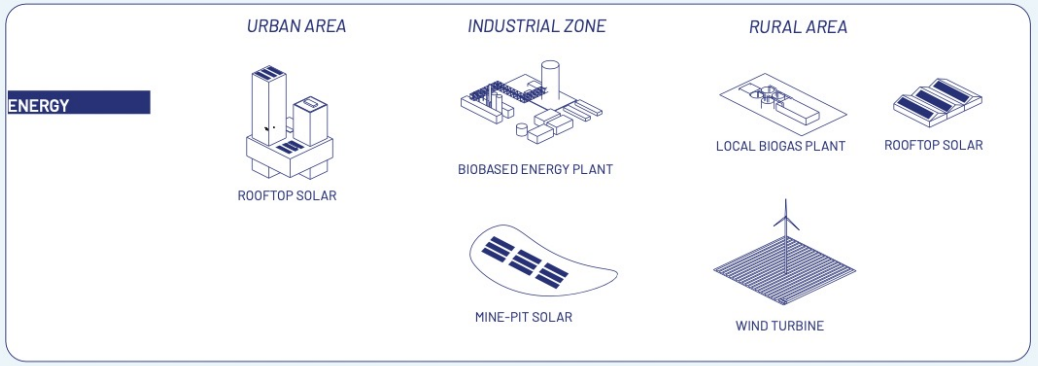


- vocational school: upgrade
- vocational school: new build
- major urban area
- project type A
- project type B
- project type C
- coal mine base



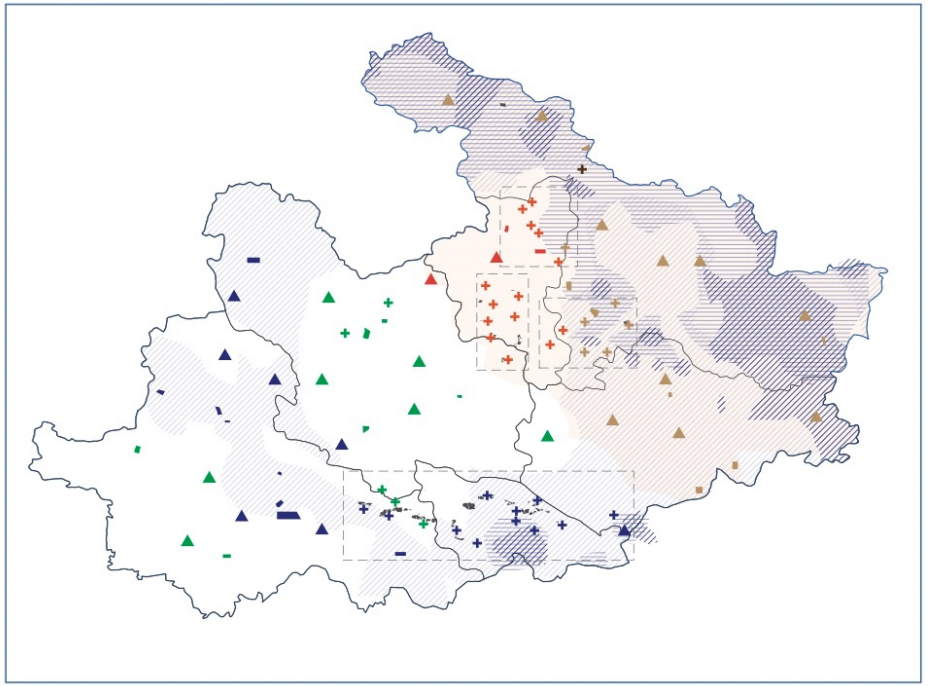
SO 2.2 strategic phasing out of coal industry



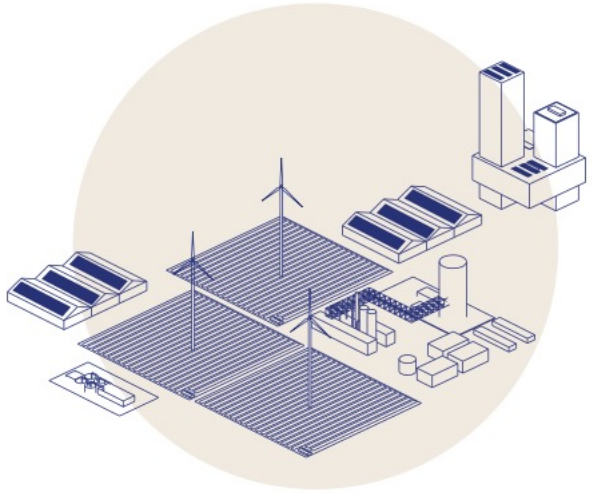


SO 2.2 Support the phasing out of coal mine industry with agriculture-integrated methods

2.2.1 establish renewable power supply in NA based on energy production potential

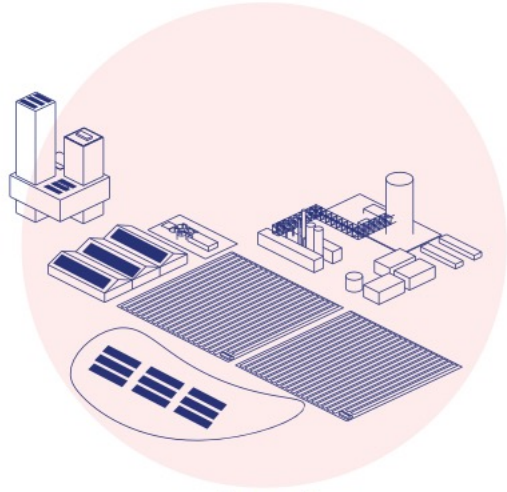


Energy Transformation Type 1
Energy Transformation Type 2
Energy Transformation Type 3
Energy Transformation Type 4



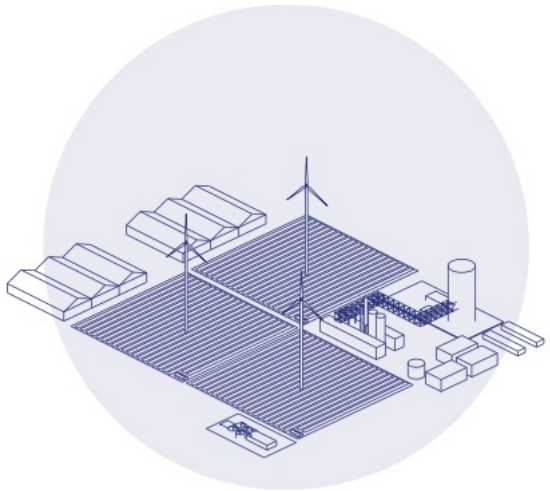
[TYPE 1]

WIND + SOLAR + BIOMASS



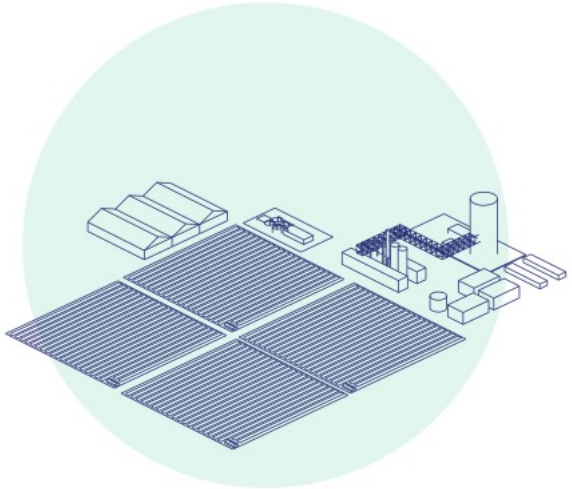
[TYPE 2]

SOLAR + BIOMASS



[TYPE 3]

WIND + BIOMASS

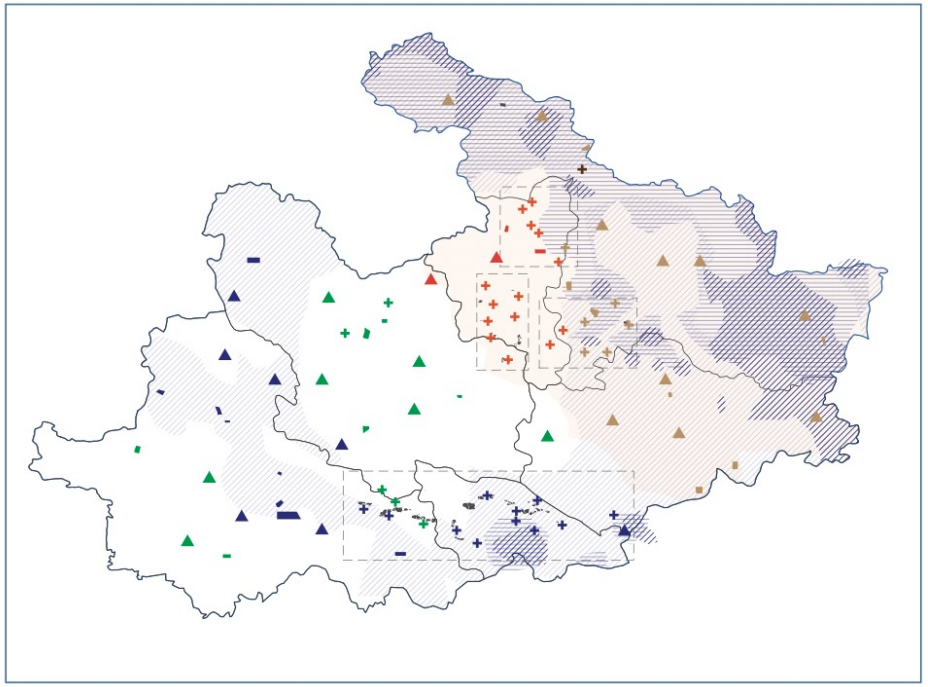


[TYPE 4]

BIOMASS

SO 2.2 Support the phasing out of coal mine industry with agriculture-integrated methods

2.2.1 establish renewable power supply in NA based on energy production potential



Energy Transformation Type 1
Energy Transformation Type 2
Energy Transformation Type 3
Energy Transformation Type 4

estimated project area energy production

67.1 billion kWh

which can replace

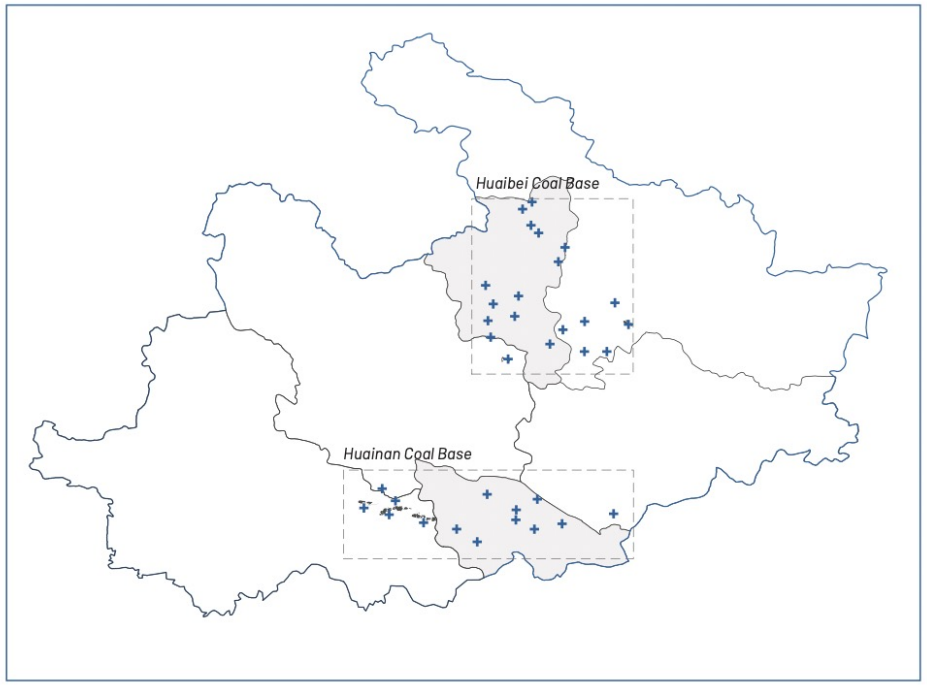
40%

of the total coal generation capacity of Two Huai coal base

*detail modeling please see appendix

SO 2.2 Support the phasing out of coal mine industry with agriculture-integrated methods

2.2.2 introduce circularity business to the coal mine region



Energy Recovery and Utilization

Water Resource Management

Waste Management and Recycling

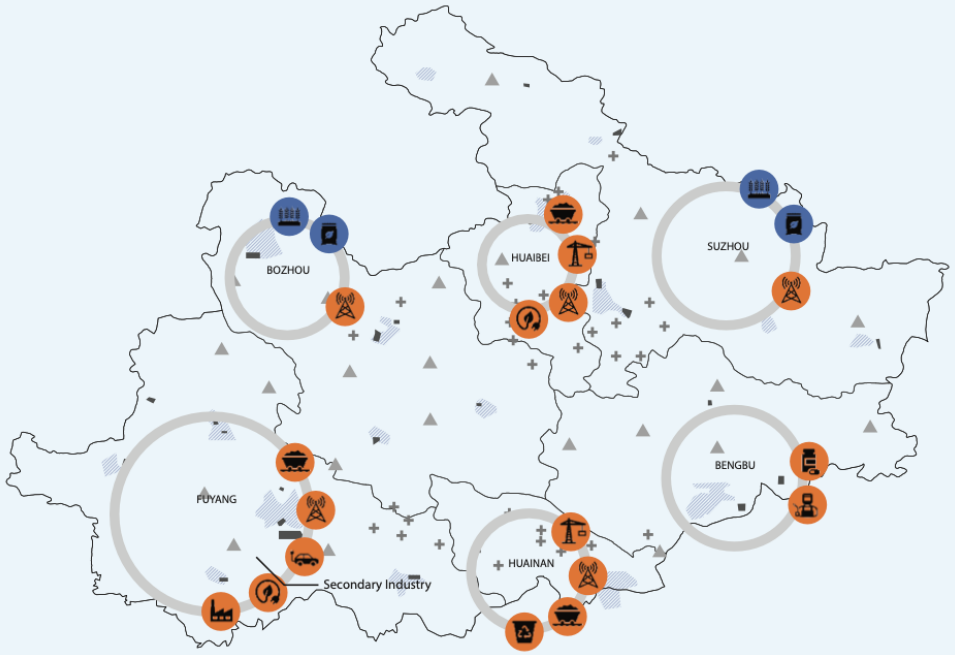
Ecotourism and Ecological Restoration

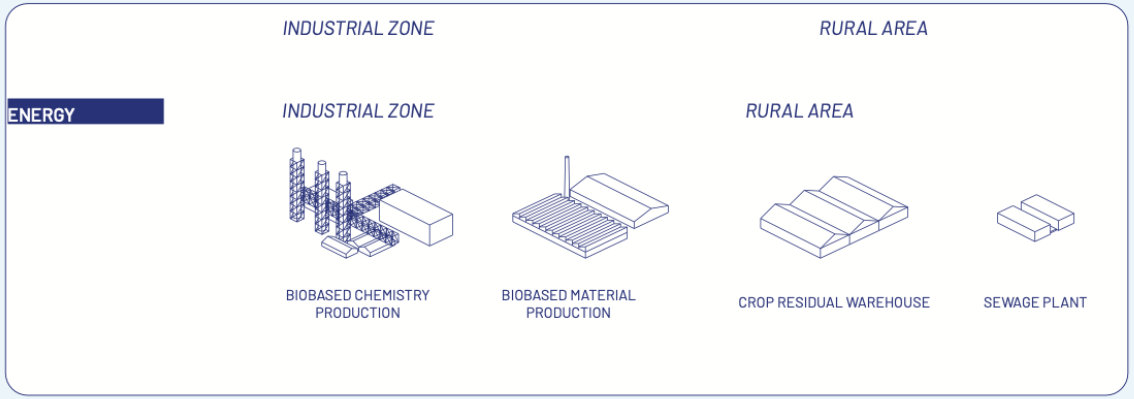
New Material Production

Agriculture and Bioeconomy

image source (from top left to bottom right)
https://rb.gy/usdva; https://rb.gy/vfjir; https://rb.gy/kw4e2; https://rb.gy/r0d4b; https://rb.gy/q6zbg

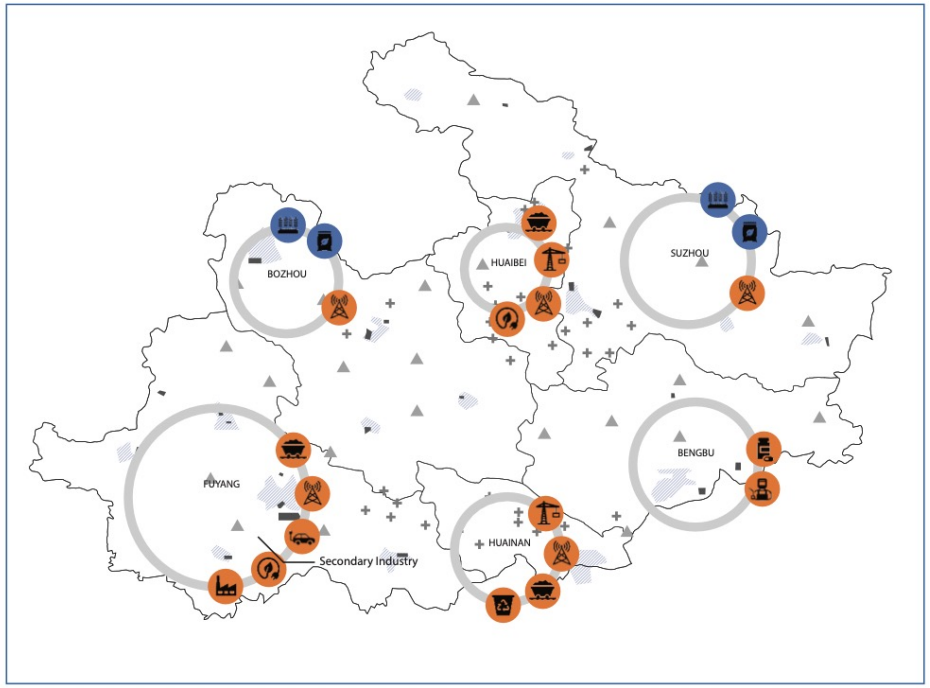
SO 2.3 Complete agriculture production value chain with circular production infrastructure



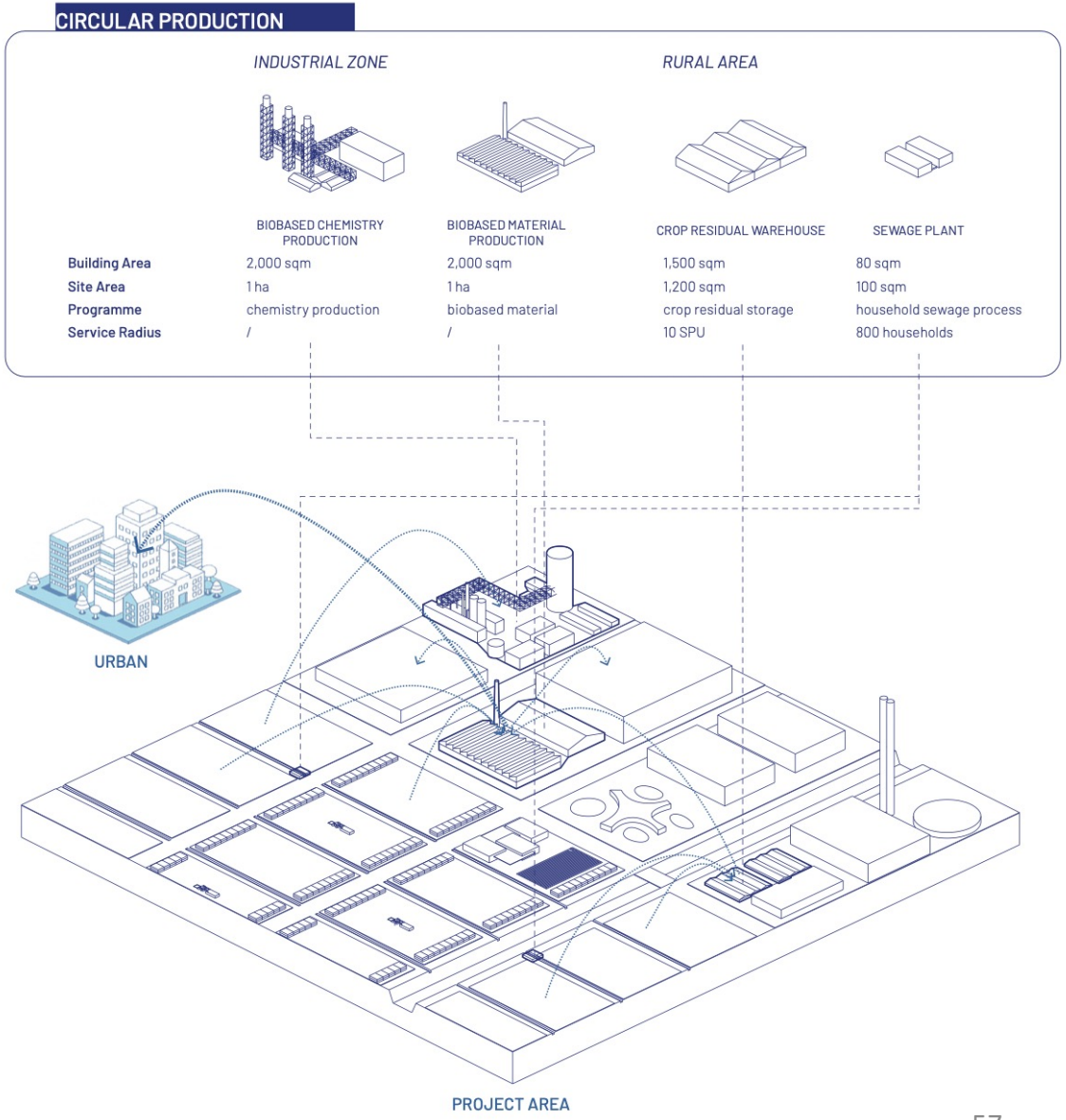


SO 2.3 Complete agriculture production value chain with circular production infrastructure

2.3.2 insert circular production facilities based on local industrial basis



major urban area
project type A
project type B
project type C
coal mine base



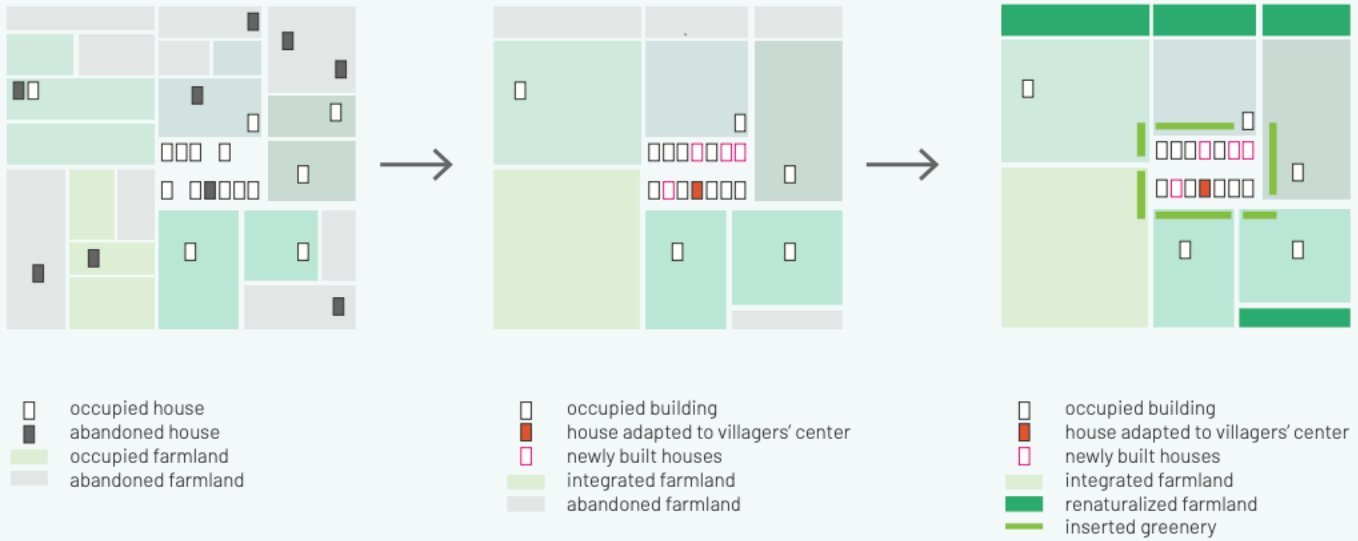
GOAL 3

Produce while Regenerating

production activities as opportunities to re-pair and regenerate local eco-system

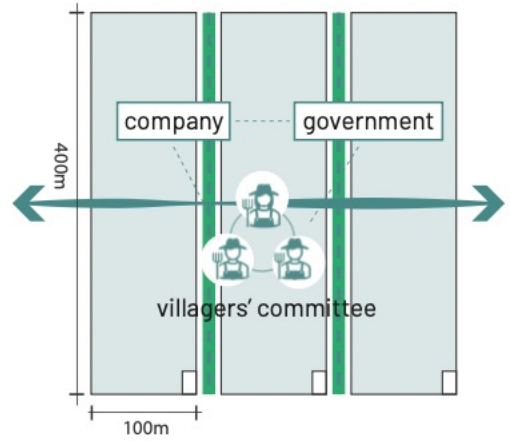
Project Area

SO 3.1 Scale up agriculture production



SO 3.1 Scale up agriculture production

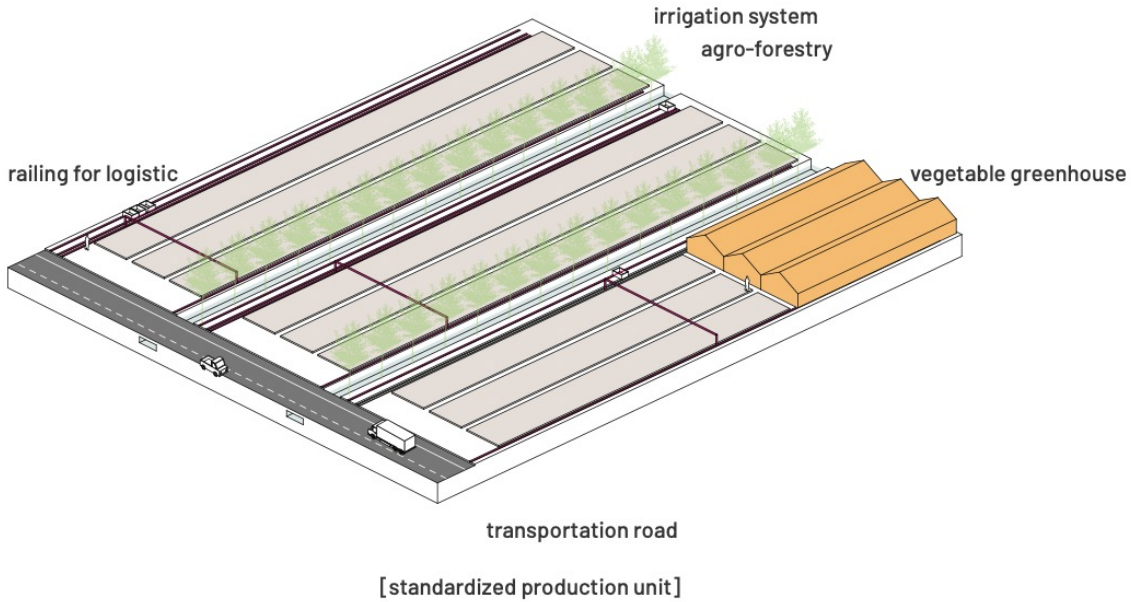
3.1.1 integrate fragmented abandoned farmland

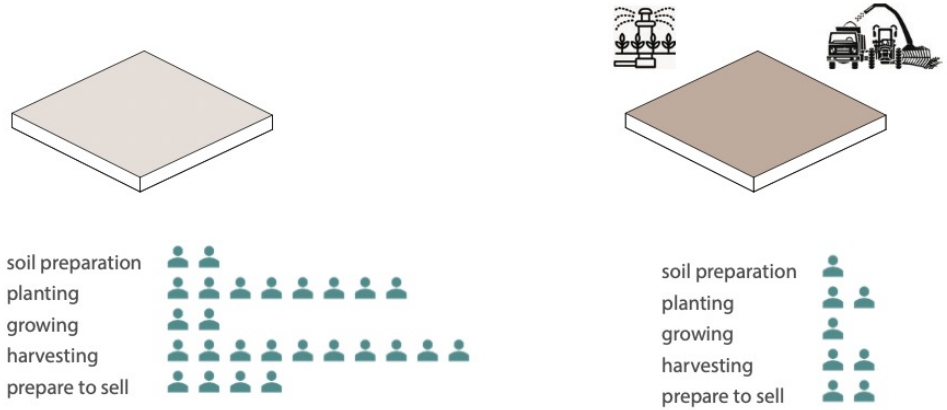


Property right integration
Through the collaboration between three sector

SO 3.1 Scale up agriculture production

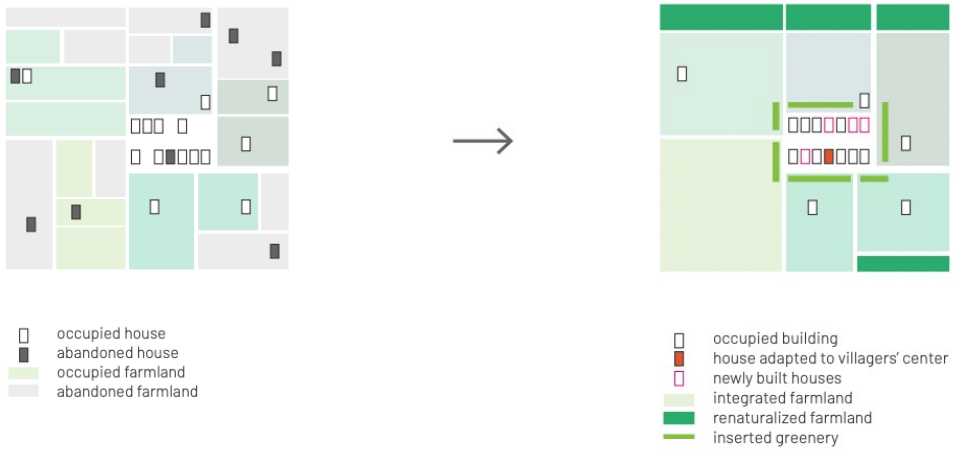
3.1.2 introduce scale production infrastructure (sewing, harvesting, censoring and irrigation facility)

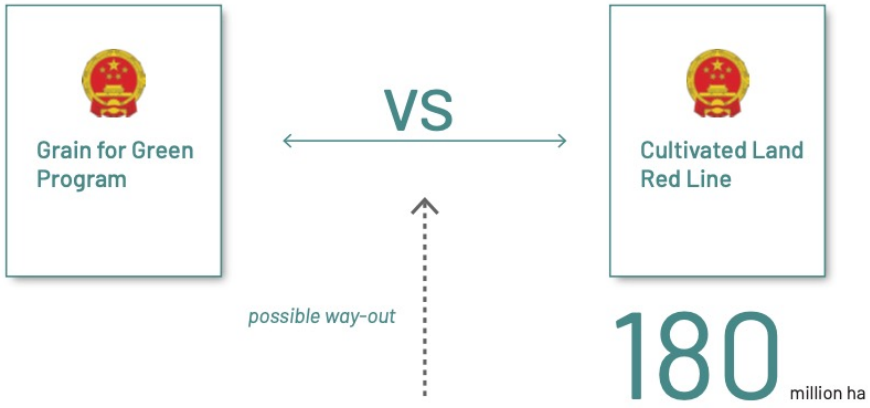




SO 3.1 Scale up agriculture production

3.1.3 transform redundant farmland into ecologic plot



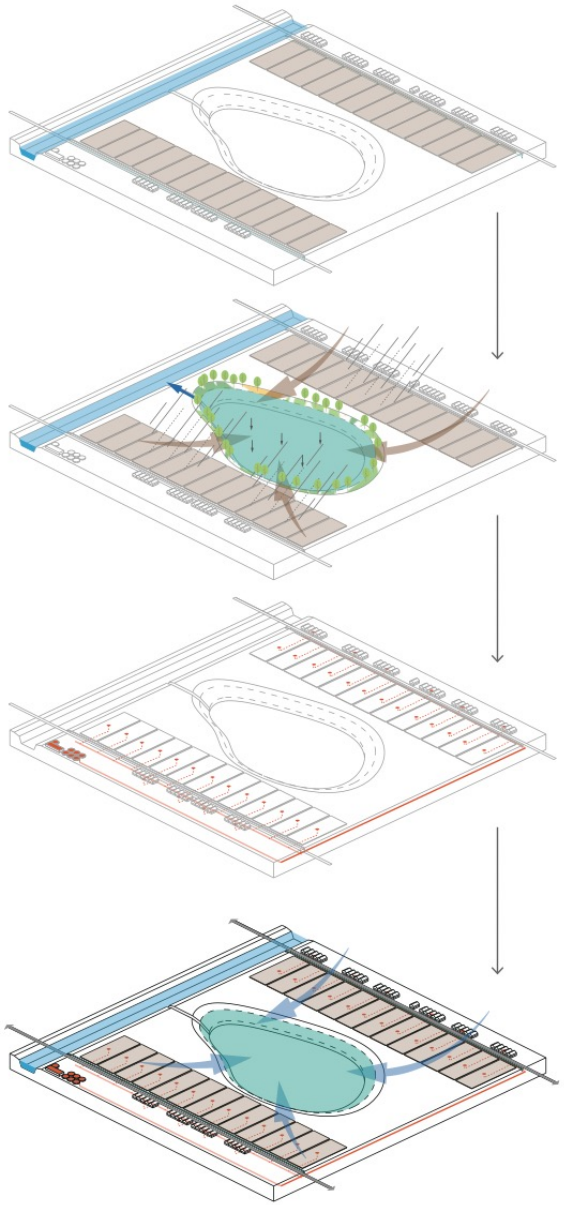


scale production makes room for renaturalized public green

SO 3.2 **Purify contaminated soil through a multi-method approach**

3.2.1 adjust local ditch system in a minimized manner to form mine-pit resolution system
3.2.2 introduce purifying crops and plants


Source: google earth



irrigation

Irrigation system will be a combination of both nature stream and mechanized irrigation facilities to maximize accuracy and efficiency.

surface run-off

Surface runoff of rainfall is separately guided to flow into the nearby mine-pit lake, where the depth of mine-pit can allow pollutants to settle to the bottom of the lake.

integrated pipeline system

Construct new sewage system to further control farming and household sewage to be processed.

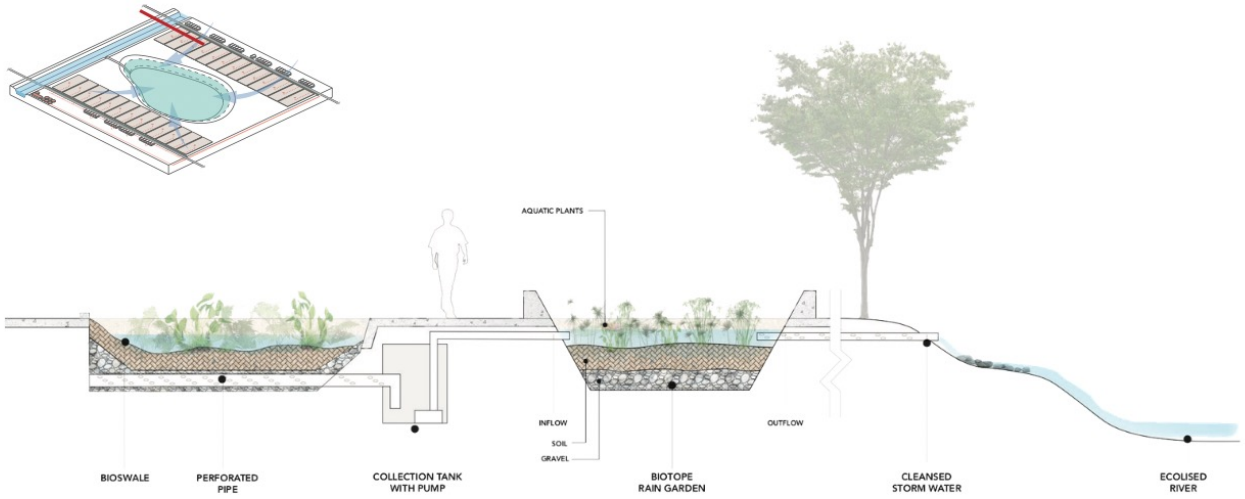
multi-method purification strategy

In this new multi-layer system, the pollution of North Anhui rural area can be effectively controled and remedi-ated.

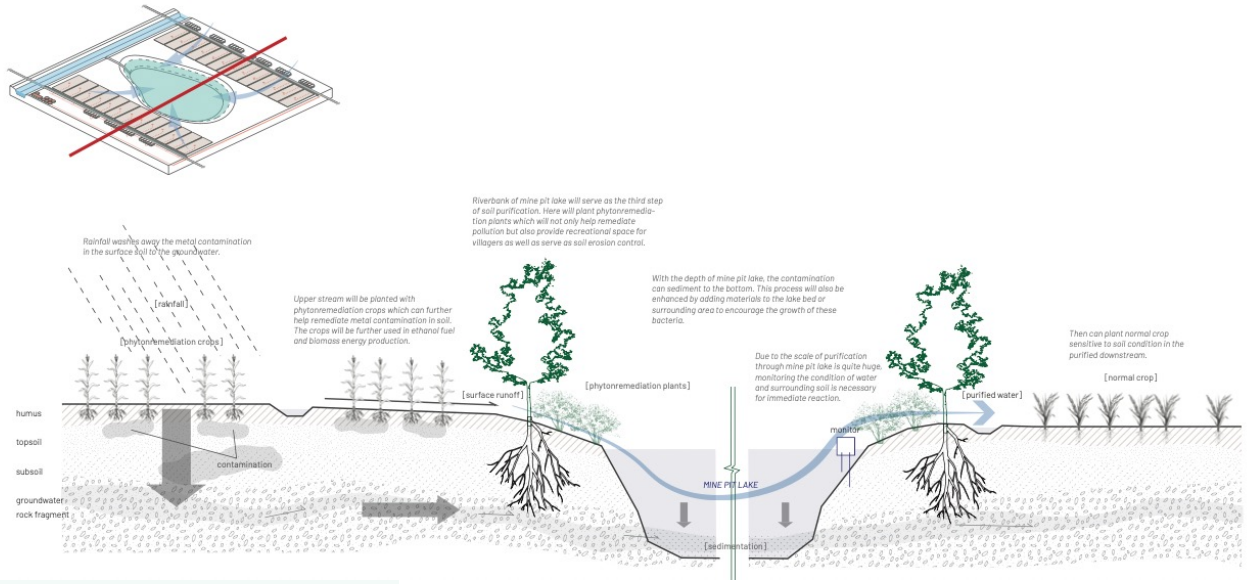
SO 3.2 **Purify contaminated soil through a multi-method approach**

3.2.3 Re-naturalize waterfront

"nature" the riverfront



"nature" the mine-pit lake waterfront



GOAL 4

Start Here, Start Together

communitarian governance for realization of place-based circular transition

Yangtze River Delta | North Anhui | Project Area

SO 4.1 Establish multi-scalar coordination

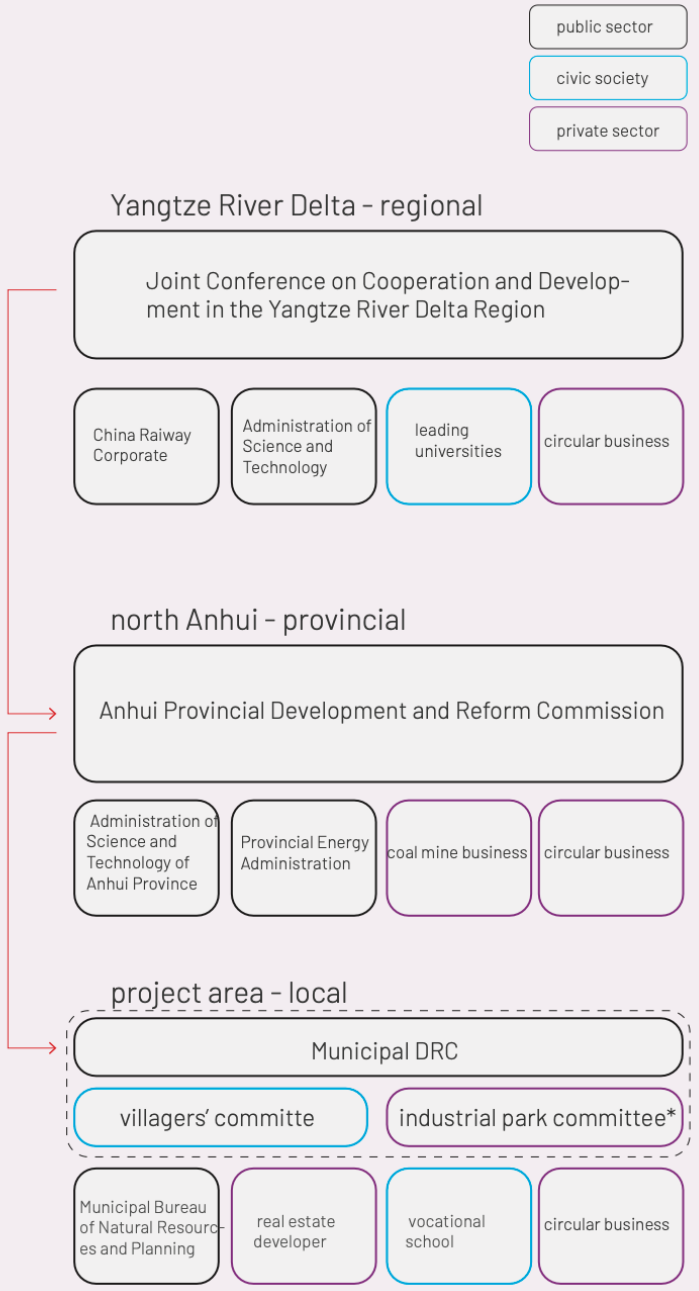
4.1.1 set up multi-scalar (NA, city, project area) coordination
4.1.2 secure feasibility through people-oriented public-private partnership

Yangtze River Delta Integrated Development Strategy

中华人民共和国国家发展和改革委员会
National Development and Reform Commission

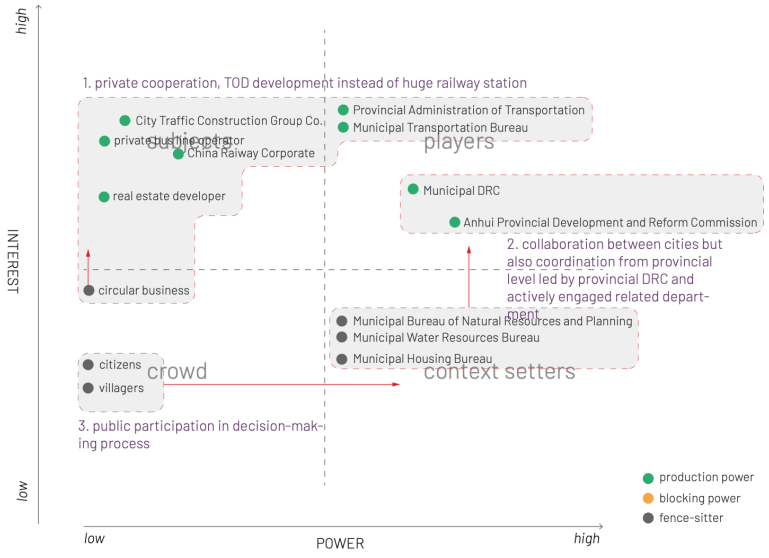
Dual Carbon Program (3060 program)

STATE COUNCIL 国务院



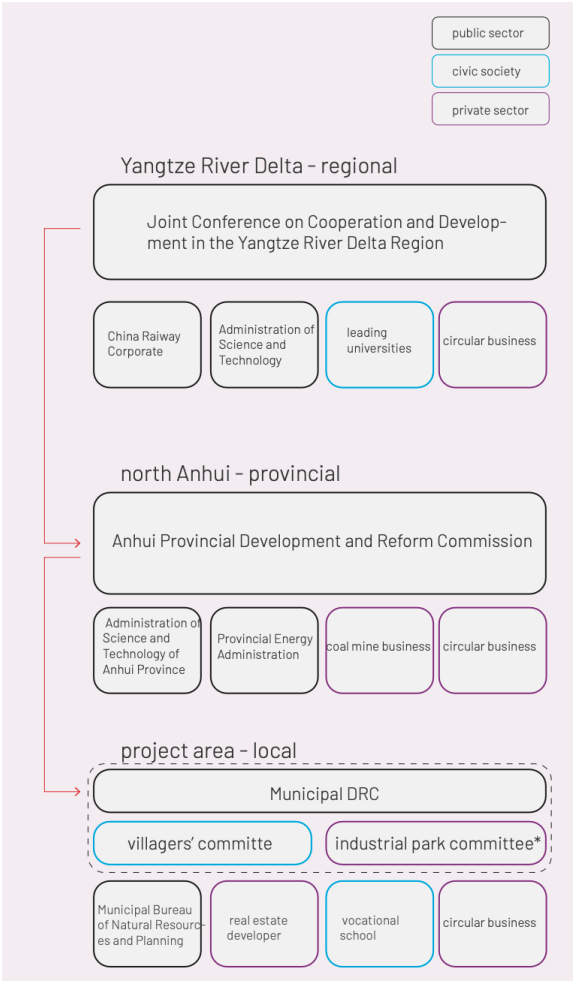
Step 1

analyze



Step 2

organize through MULTI-SCALE COORDINATION



Step 3

Secure by policy tools

SHAPING

shape decision environment of devleopment actors by setting broad context for market actions and transactions

change of landuse surrounding train station area

publication of planning project and engage the public

REGULATING

constrain decision environemtn of development actors by regulating or controlling market actions and transactions

CAPACITY BUILDING

enable development actors to operate more effectively within their decision environment, and so facilitate the operations of other policy instruments

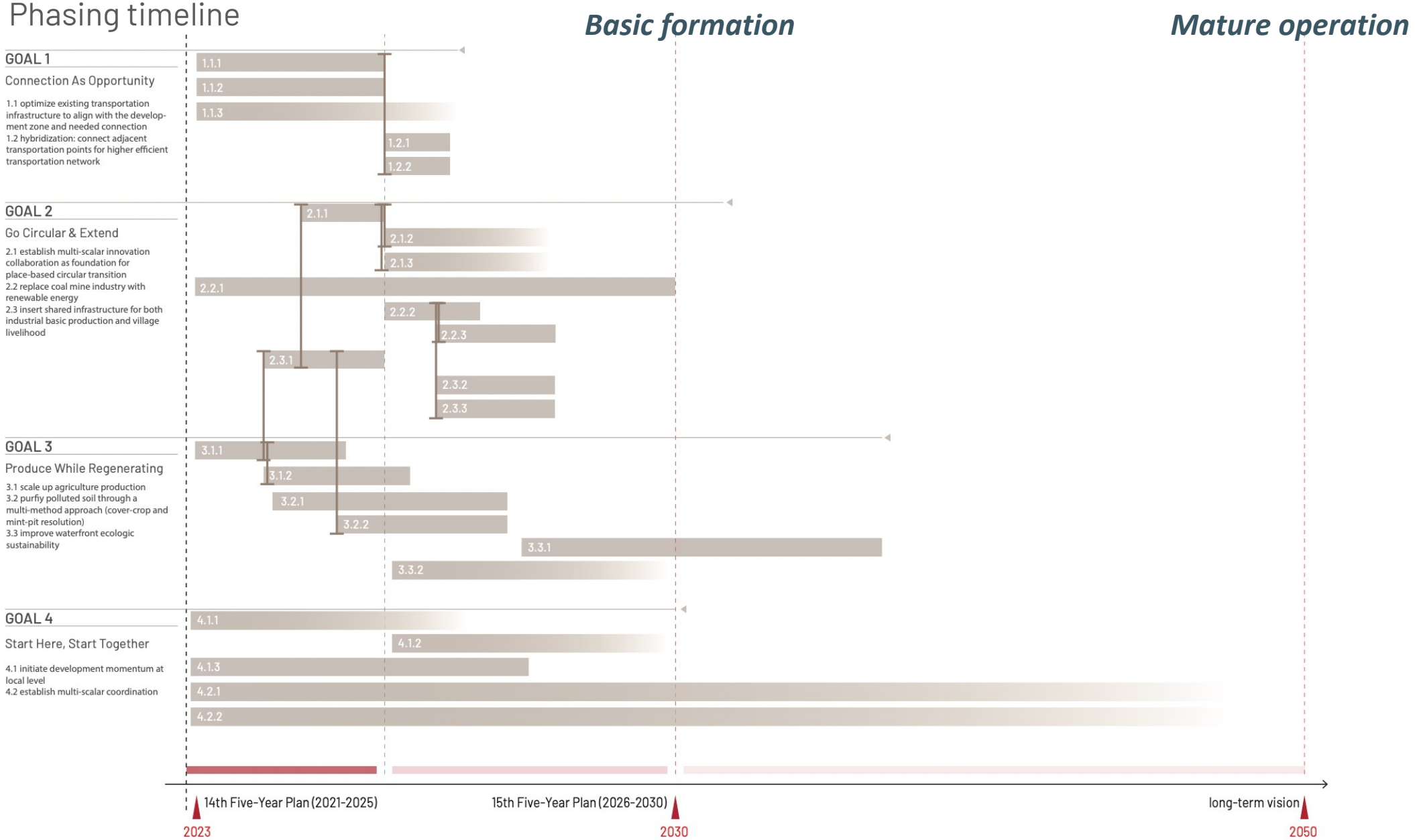
P-PPP
- collaboration of cross-border bus line
- collaboration of TOD construction

STIMULATING

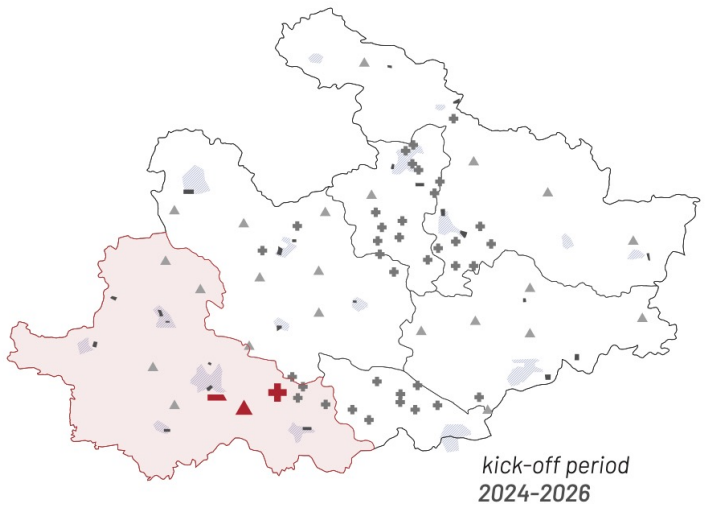
expand decision environment of development actors by facilitating market actions and transactions

tax reduction to attract circular business to locate in TOD area

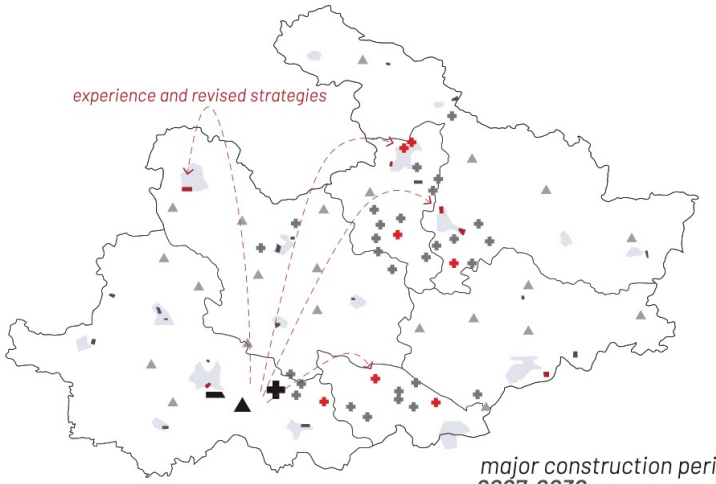
Phasing timeline



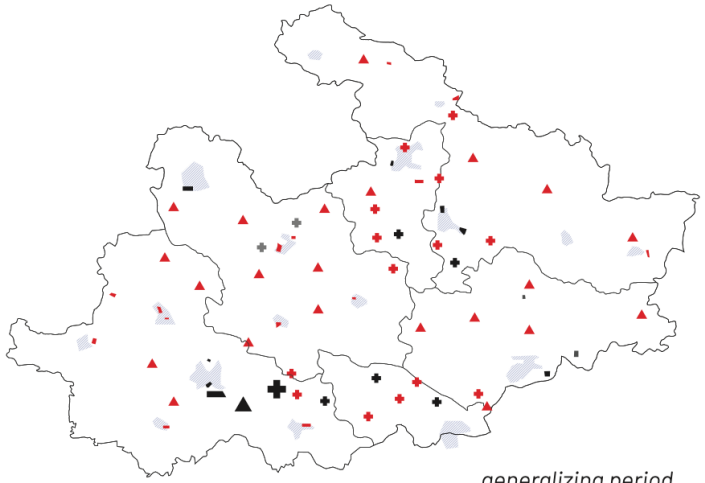
Phasing of projects



kick-off period
2024-2026

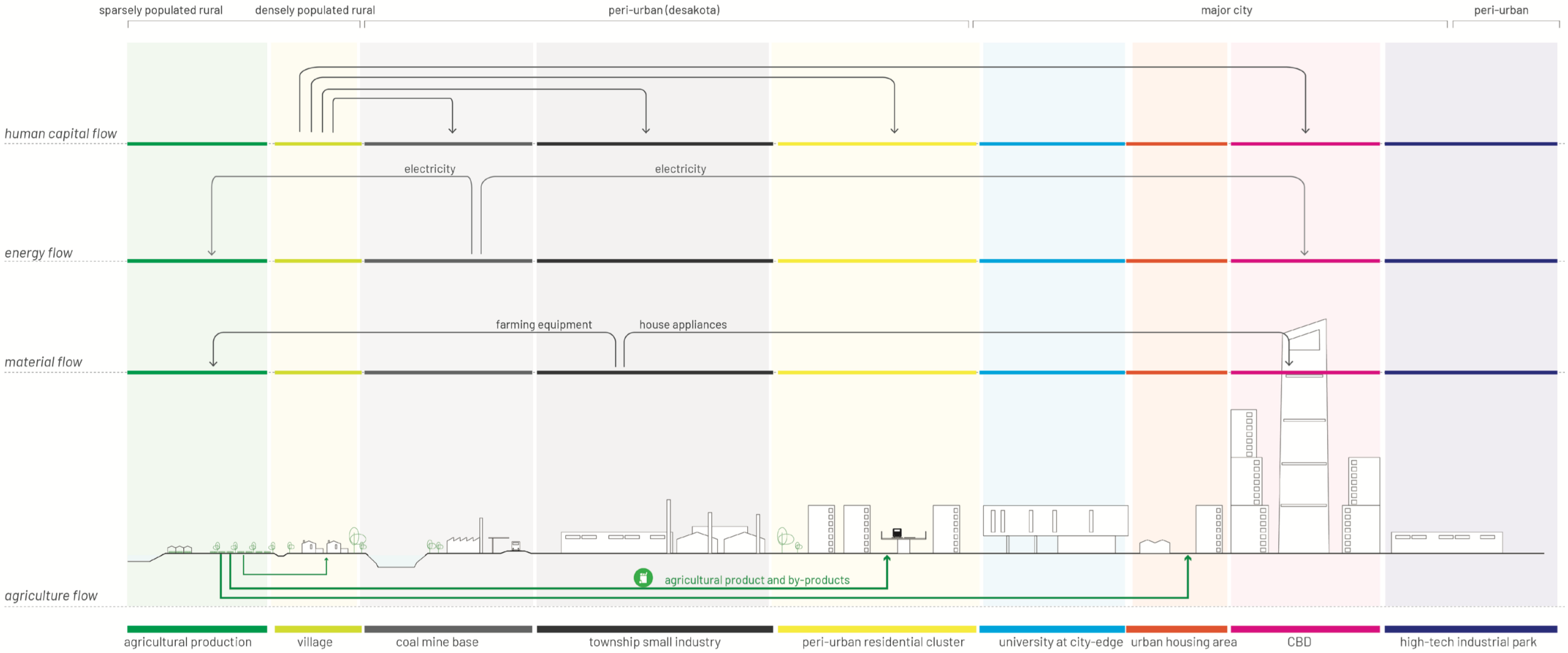


major construction period
2027-2030

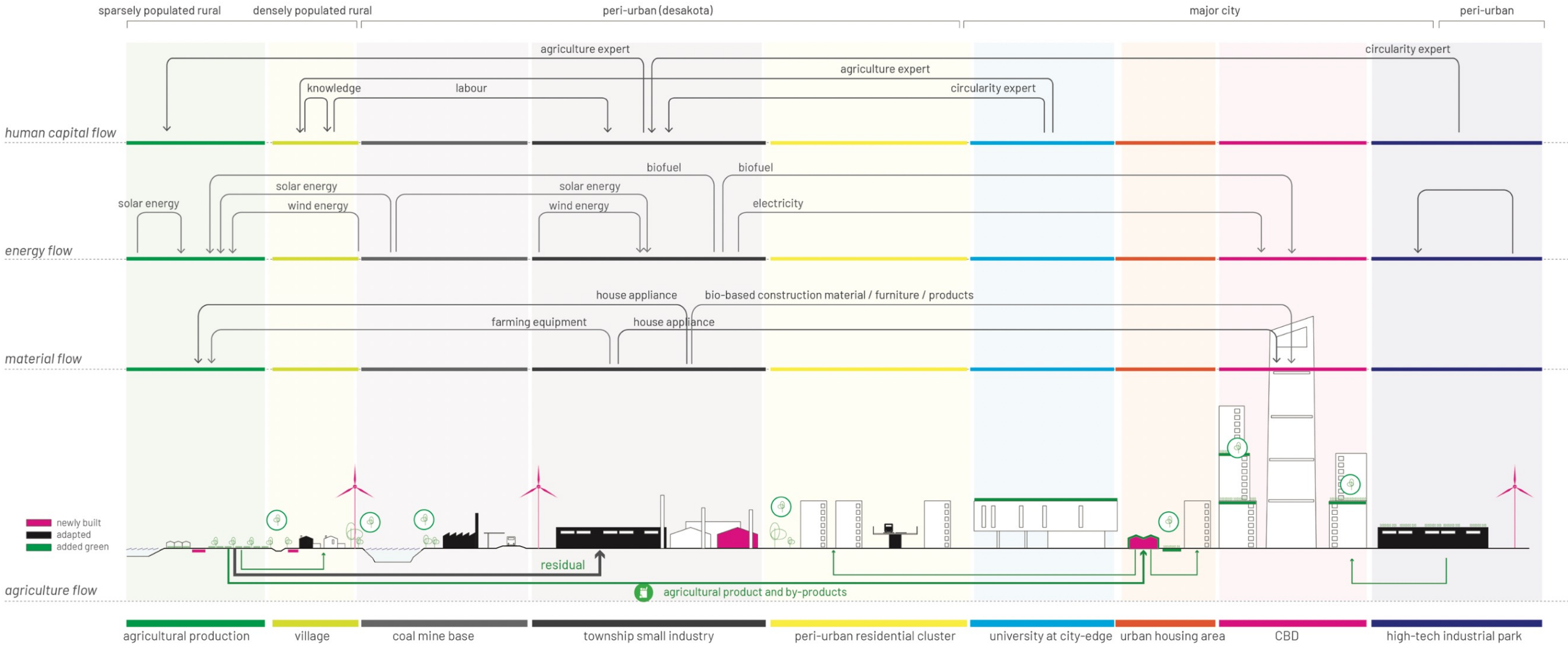


generalizing period
2031-2035

One-way relationship



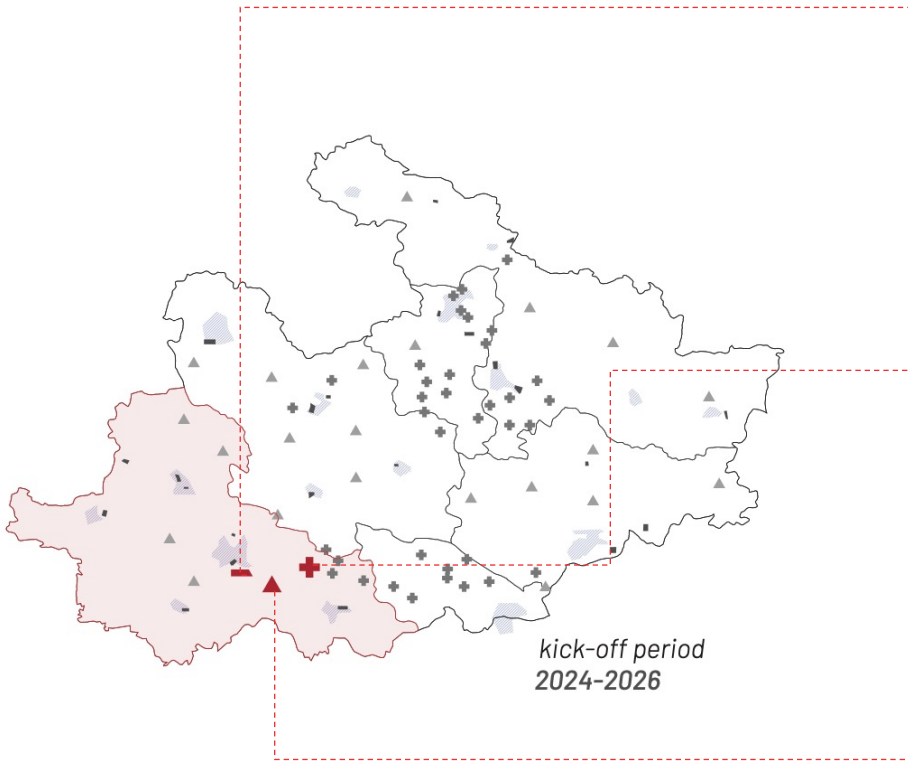
Mutual Beneficial and Interactive Region



Sub research question 3

What corresponding spatial and engagement strategies at the local scale can secure the feasibility of the circular transition?

Overview



PROJECT TYPE A | CITY EDGE INDUSTRIAL PARK
PILOT PROJECT: Fuyang-Hefei Industrial Park

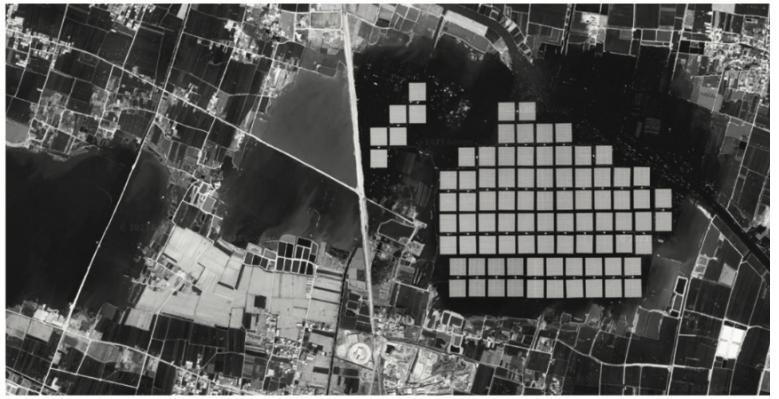
Located in the south-east periphery of Fuyang city, Fuyang-Hefei Industrial Park is a collaboratedly joint built industrial park funded by both Fuyang and Hefei municipality as part of the joint industrial parks program. It is built to utilize the capacity and strength of multiple cities and serves as a spatial container for economic and innovation collaboration. Currently, the construction of the park is still half way, leaving opportunity for further design to explore the agriculture-industry synergetic development.

PROJECT TYPE B | PHASING-OUT COAL MINE BASE
PILOT PROJECT: China Coal Xinji Liuzhuang Coal Mine

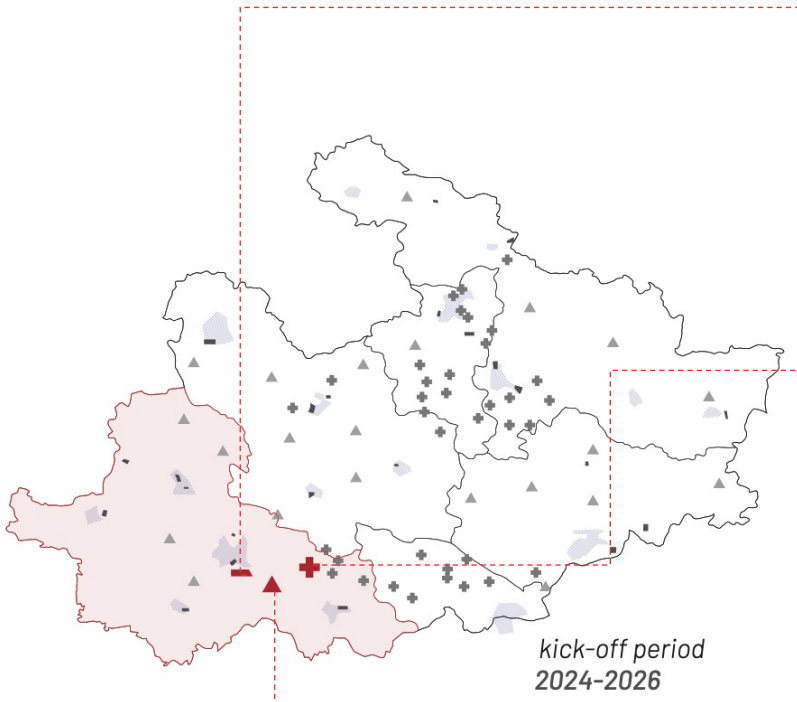
Located in Yinshang County (颍上县) in the east part of Fuyang municipality, China Coal Xinji Liuzhuang Coal Mine is in the phase of gradual closure. The previous mine pits are now filled with water with uncontrolled lake bank intruding surrounding farm lands. One of the biggest mine pit is now covered with solar panels with an energy generating capacity of c.a. 50 MW as part of the coal mine company transformation attempt to answer Dual-Carbon Goal (carbon neutrality and carbon peak).

PROJECT TYPE C | STREET TOWN
PILOT PROJECT: Liushipu Town

Located also in Yinshang, Liushipu Town is a typical "street town", linear town alongside highway, with commercial programs facing G106, national highway going through it. Small-scale family oriented workshops of industries such as metalling and processing can be found here in the ocean of farm land.



Overview



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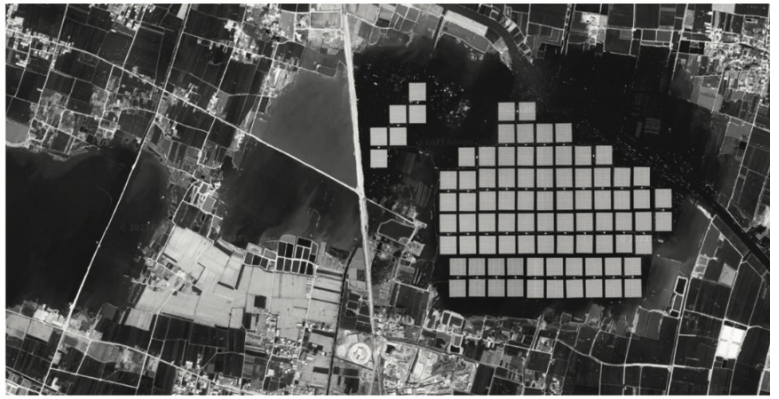

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Project Type A Pilot: Fuhe Industrial Park

GOAL 1 | CONNECT FOR OPPORTUNITY

1.1.2 connect border spaces with bus lines

1.1.3 upgrade highway with additional non-vehicle and service to the alongside villages based on angular choice analysis

1.2.2. road + water: intertwine and weave road and water system through urban design to offer quality open space and efficient amenity spatial distribution

GOAL 2 | GO CIRCULAR AND EXTEND

2.1.1 RESEARCH: establish research league for circularity transition AND set up satelite labs in NA with support from top universities in core YRD, collaborating with local leading businesses

2.1.2 EDUCATION: set up knowledge center in local villages, support vocational school launch courses to prepare labour for circular economy

2.2.1 build biobased power generating infrastructures in NA based on energy production potential

GOAL 3 | PRODUCE WHILE REGENERATING

3.1.1 integrate fragmented abandoned farmland into standardized production units(SPU)

3.1.2 introduce scale production infrastructure

3.3.1 naturize waterfront for soil erosion control and additional recreational purpose

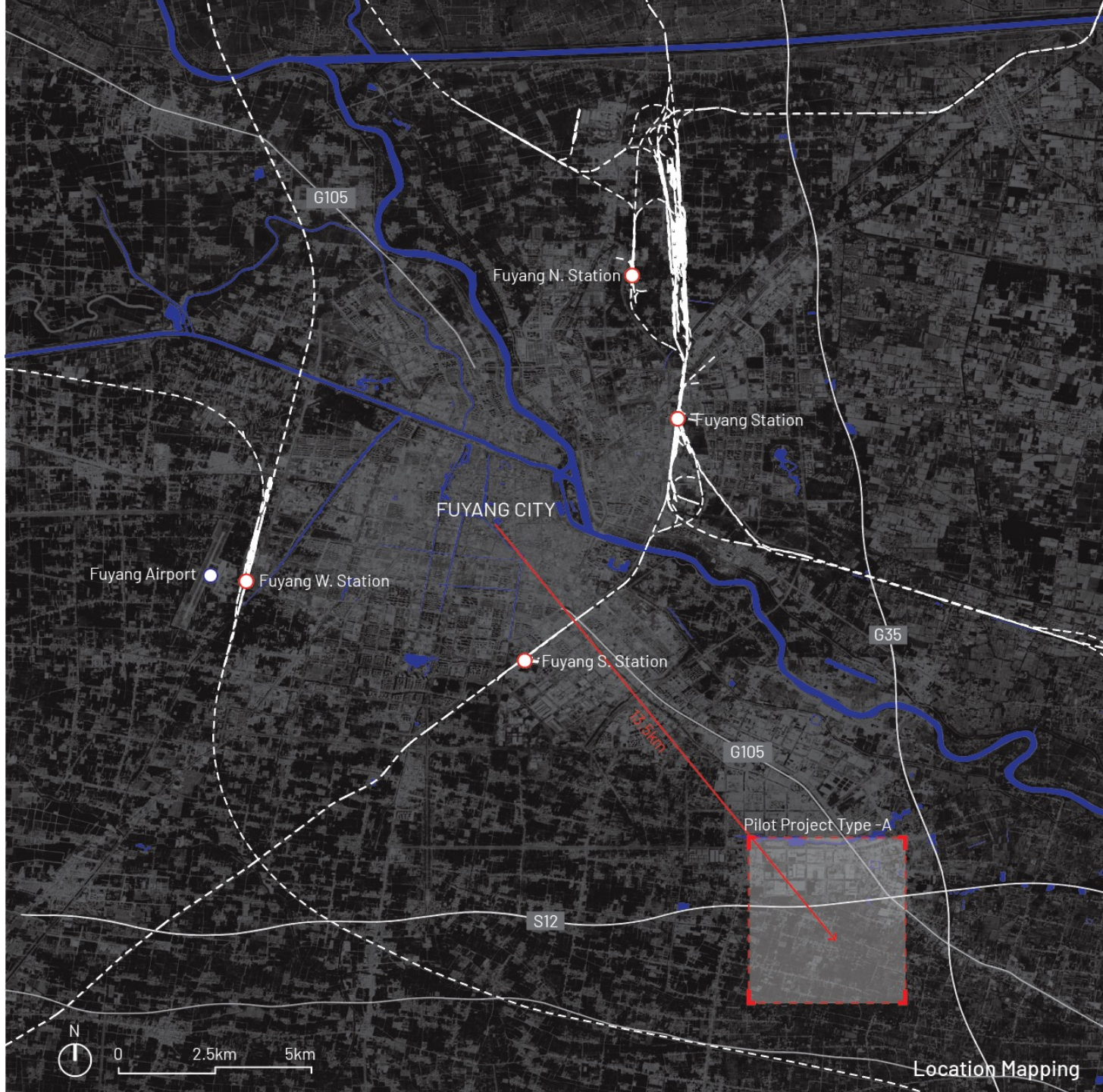
3.3.2 transform redundant farmland as green patches for villagers' recreation and local micro natural system

GOAL 4 | STAKEHOLDERS TO ENGAGE

PUBLIC: county/district government, city government, provincial government, city_planning, YRD_planning, industrial park management committee

PRIVATE: traditional industry enterprises, circularity-related new business, agriculture production related companies, small business owner

CIVIC SOCIETY: research institute, vocational school, farmer, worker, village committee



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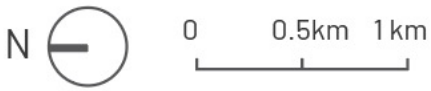


Connected to the city by highway G105.

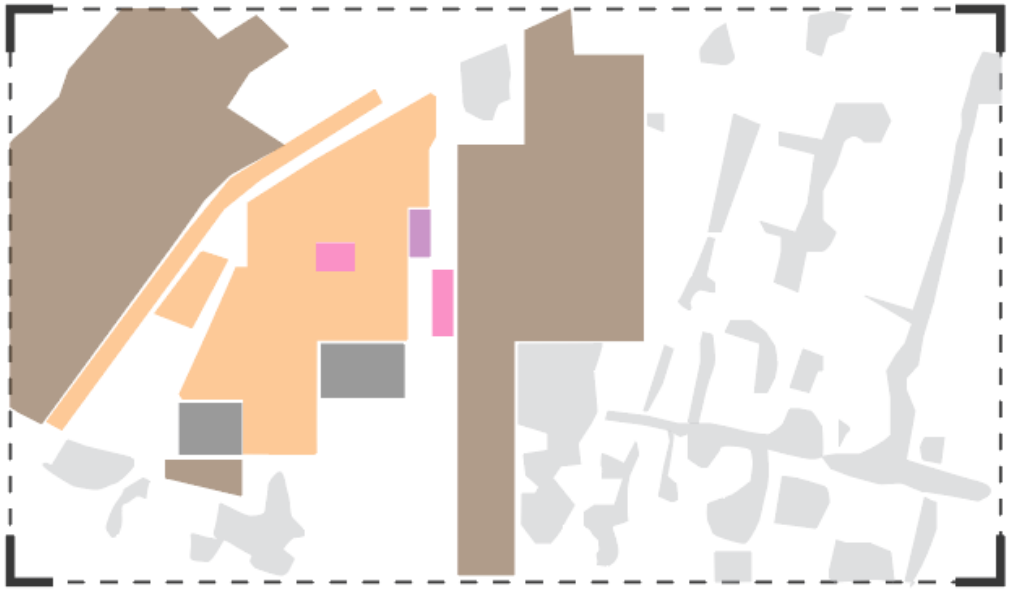
High-density commercial real estate however remain vacant.

The construction of the industrial park sprawls into agricultural land.

Spatial Analysis

[INDUSTRY VS. AGRICULTURE]

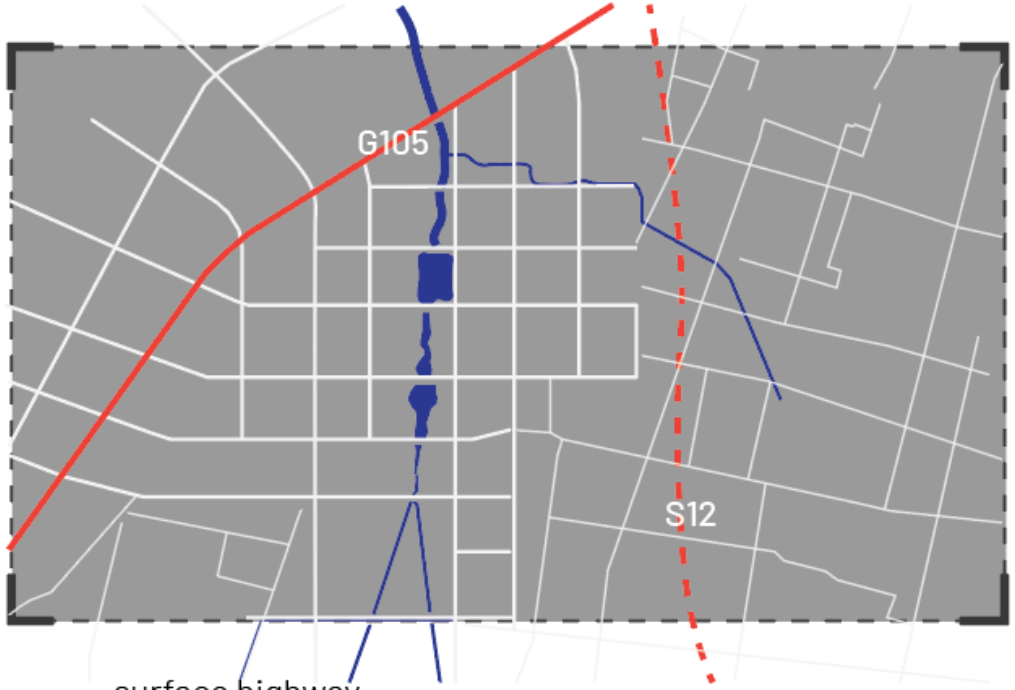
Land-use



- B2 industrial landuse
- R2 high-density residential landuse
- R1 low-density residential landuse (village)
- innovation and education
- public amenity
- construction land

[HUGE GRID VS. RURAL FABRIC]

Road Network

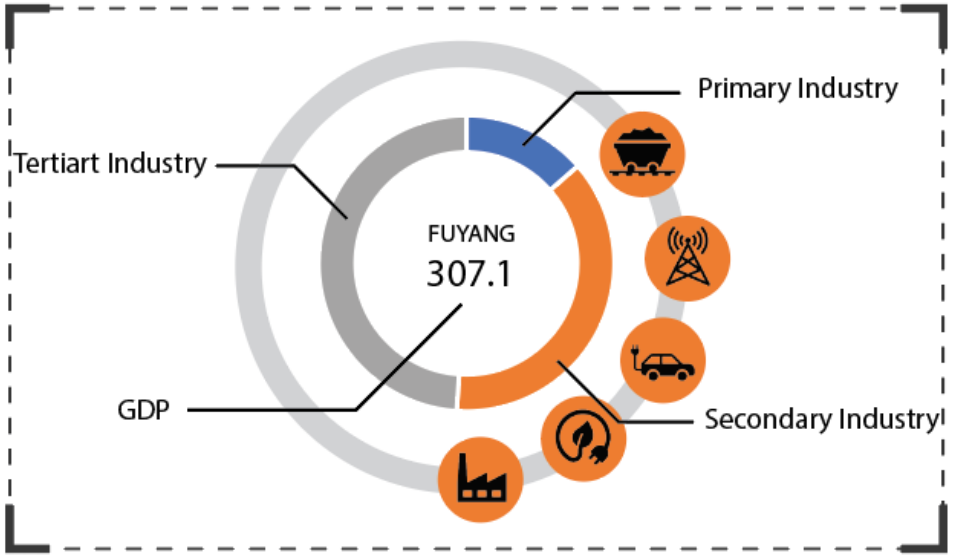


- surface highway
- elevated highway
- primary road
- secondary road
- water surface

Non-spatial Analysis

[Possibility of Circular Transition]

Industry



[local leading business]

- automobile
- construction material
- new material
- animal feed and fertilizer

[estimated GMV*]

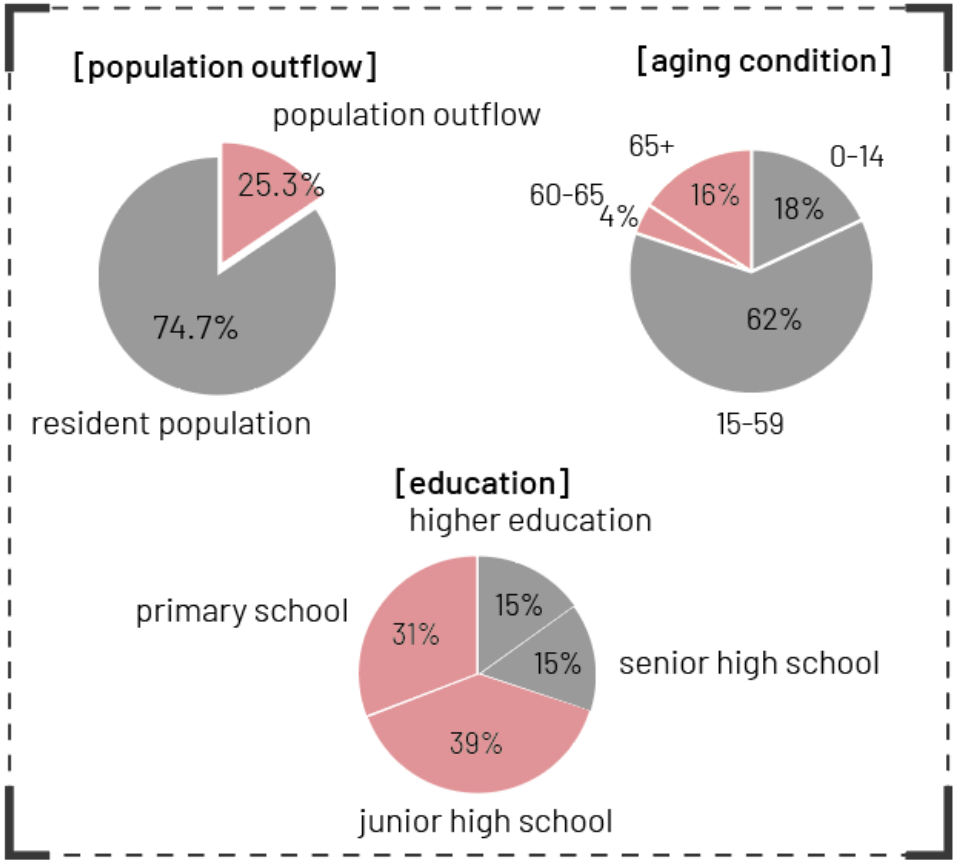
- automobile: 530 mln
- construction material: 200 mln
- new material: 15 mln
- animal feed and fertilizer: 30 mln

[Possible circularity business]

- biobased material
- biogas/biomass energy

[Outflow, Aged, Low education level]

Demographic



Goal 1
Connecting for Opportunity

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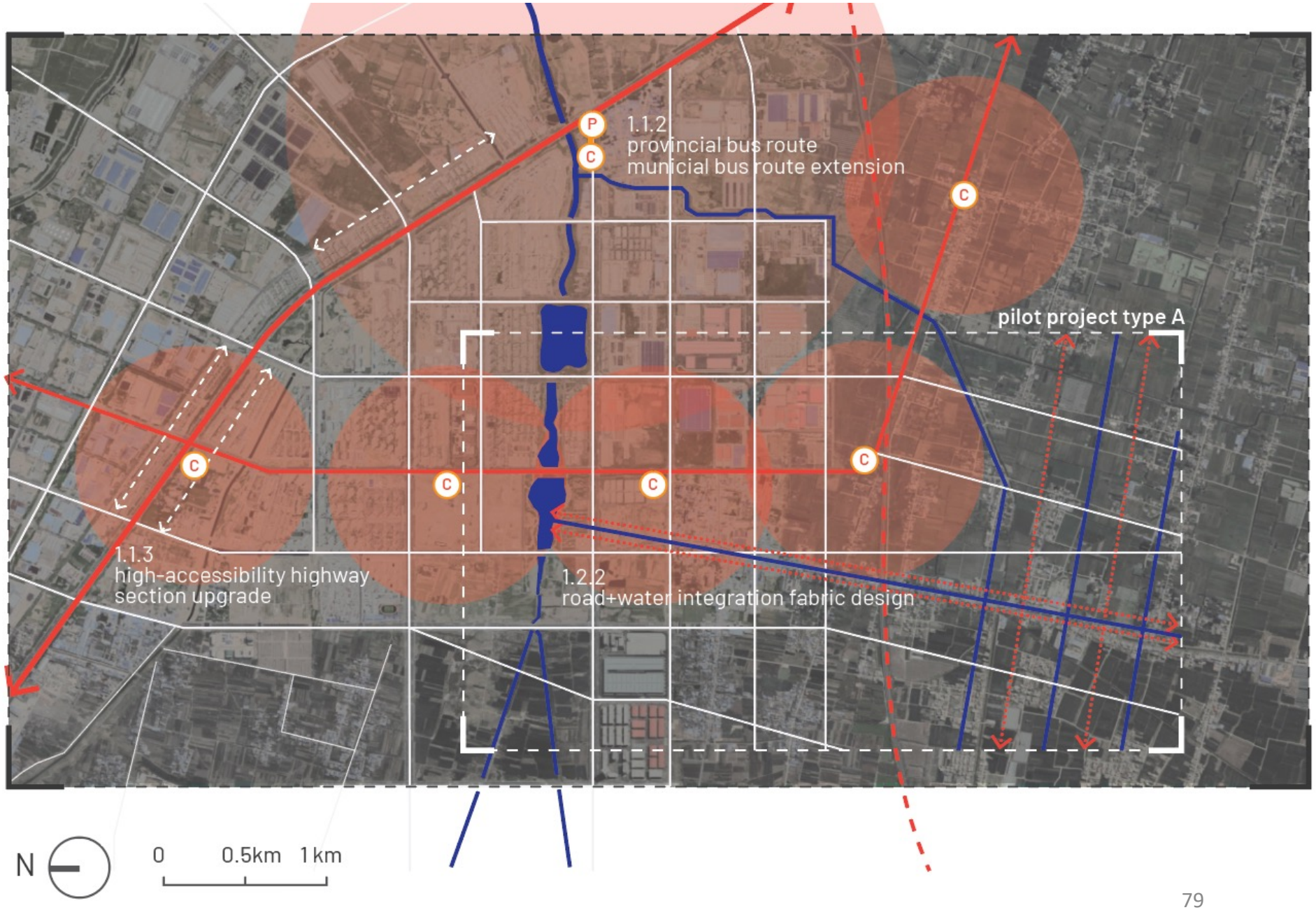

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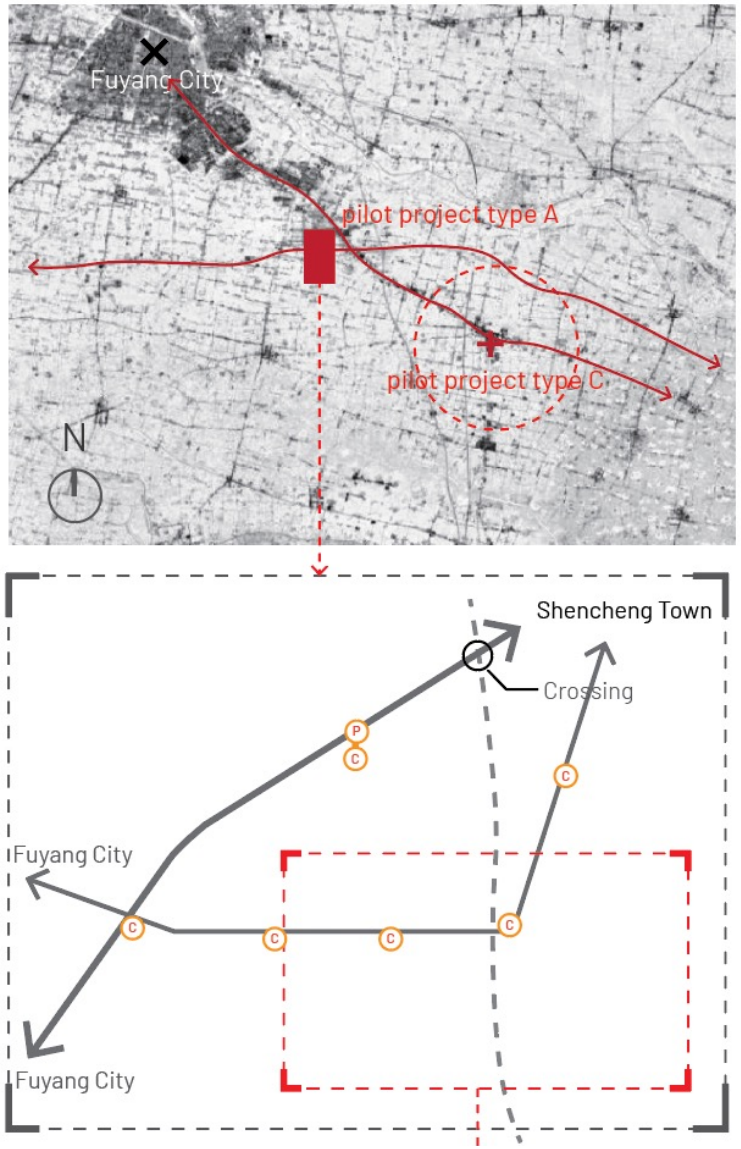

Connection between project sites

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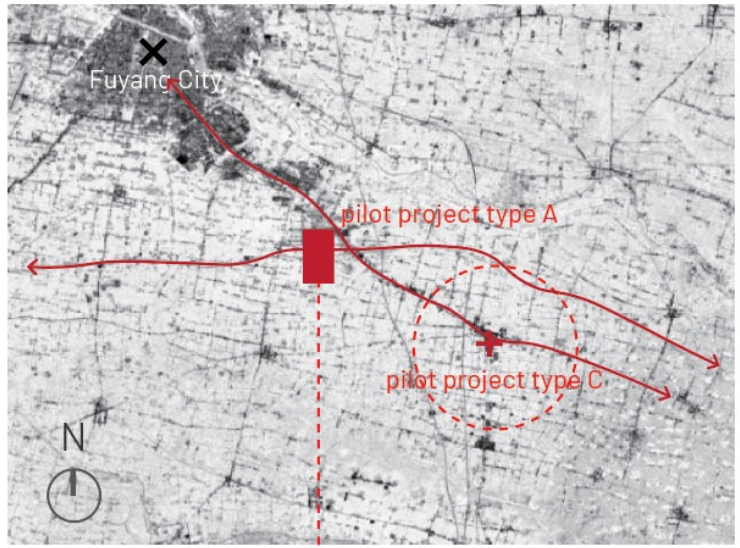

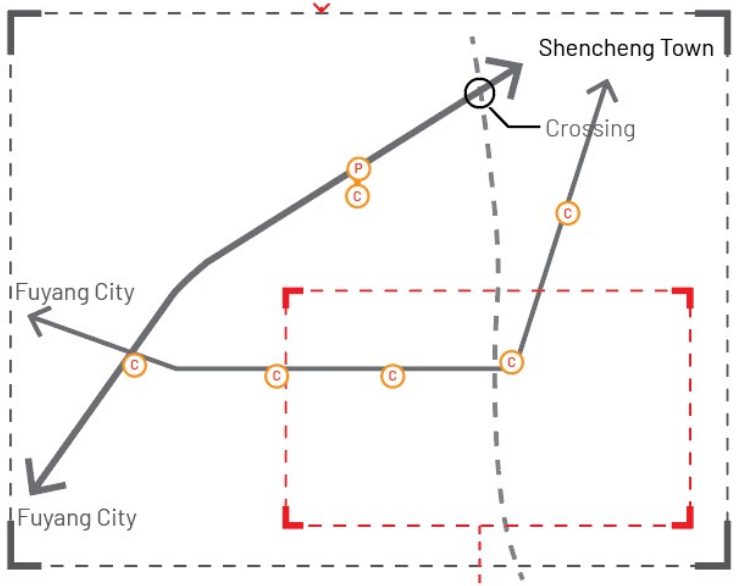

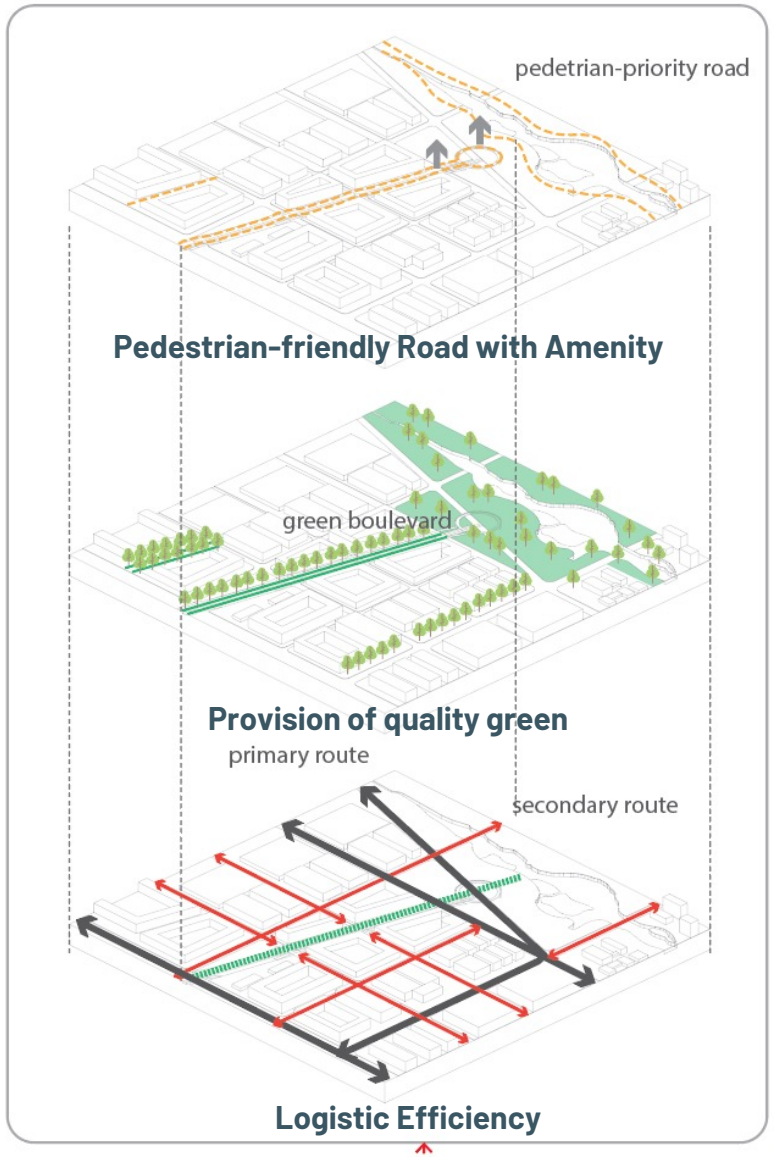

Connection between project sites

Connection within project site

Goal 2

Go Circular & Extend

2.1.1 RESEARCH: establish research league for circularity transition AND set up satelite labs in NA with support from top universities in core YRD, collaborating with local leading businesses

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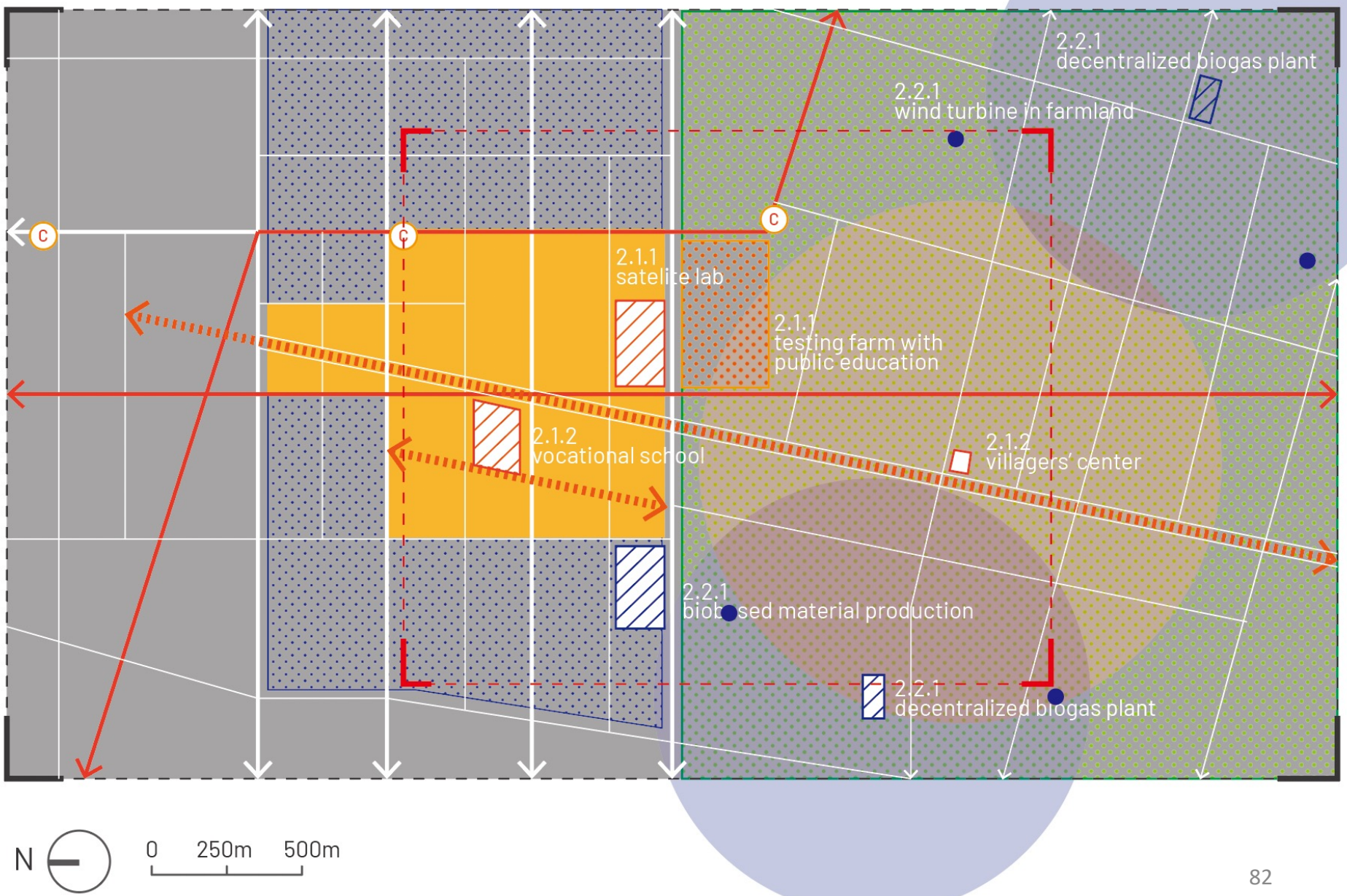

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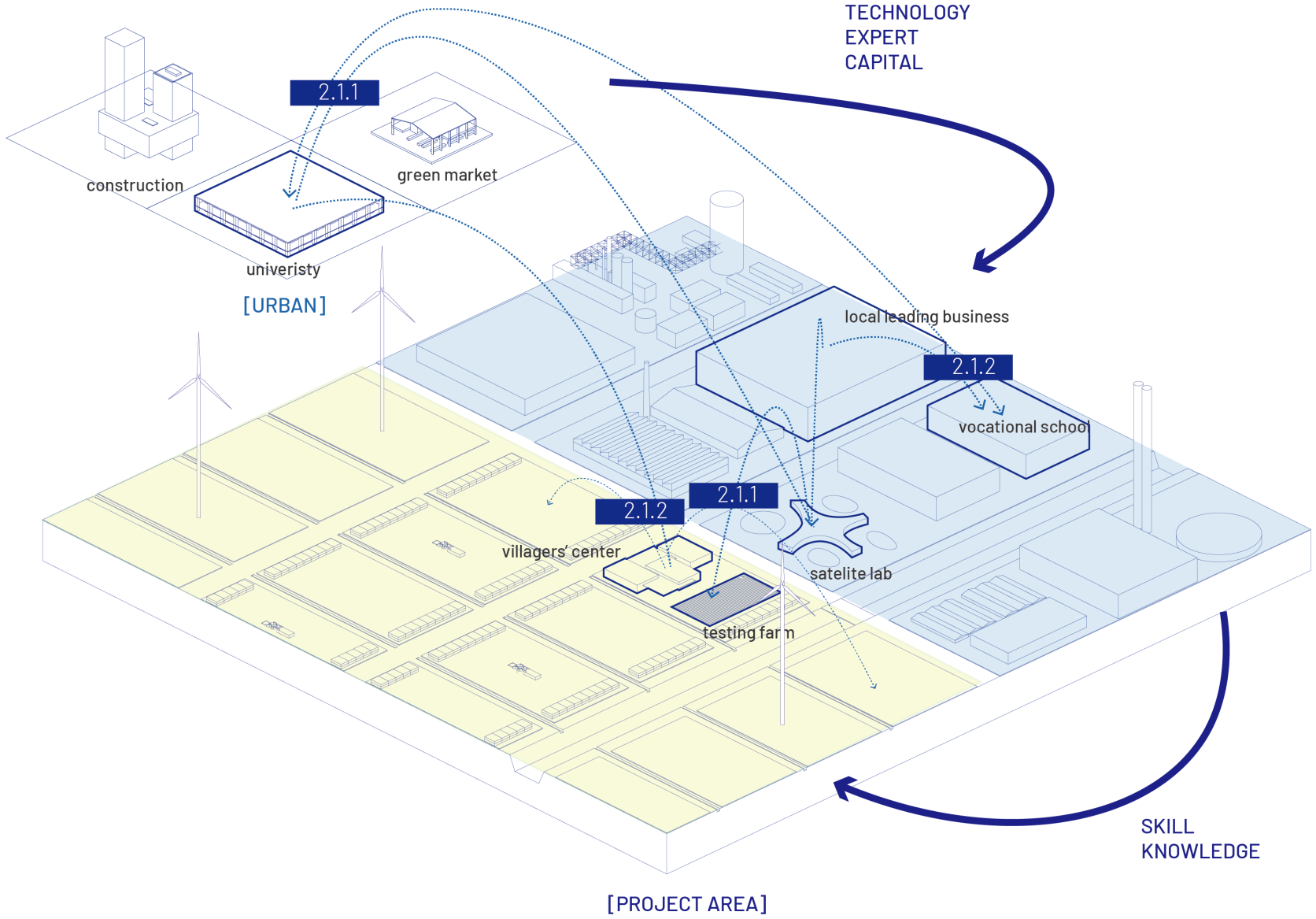

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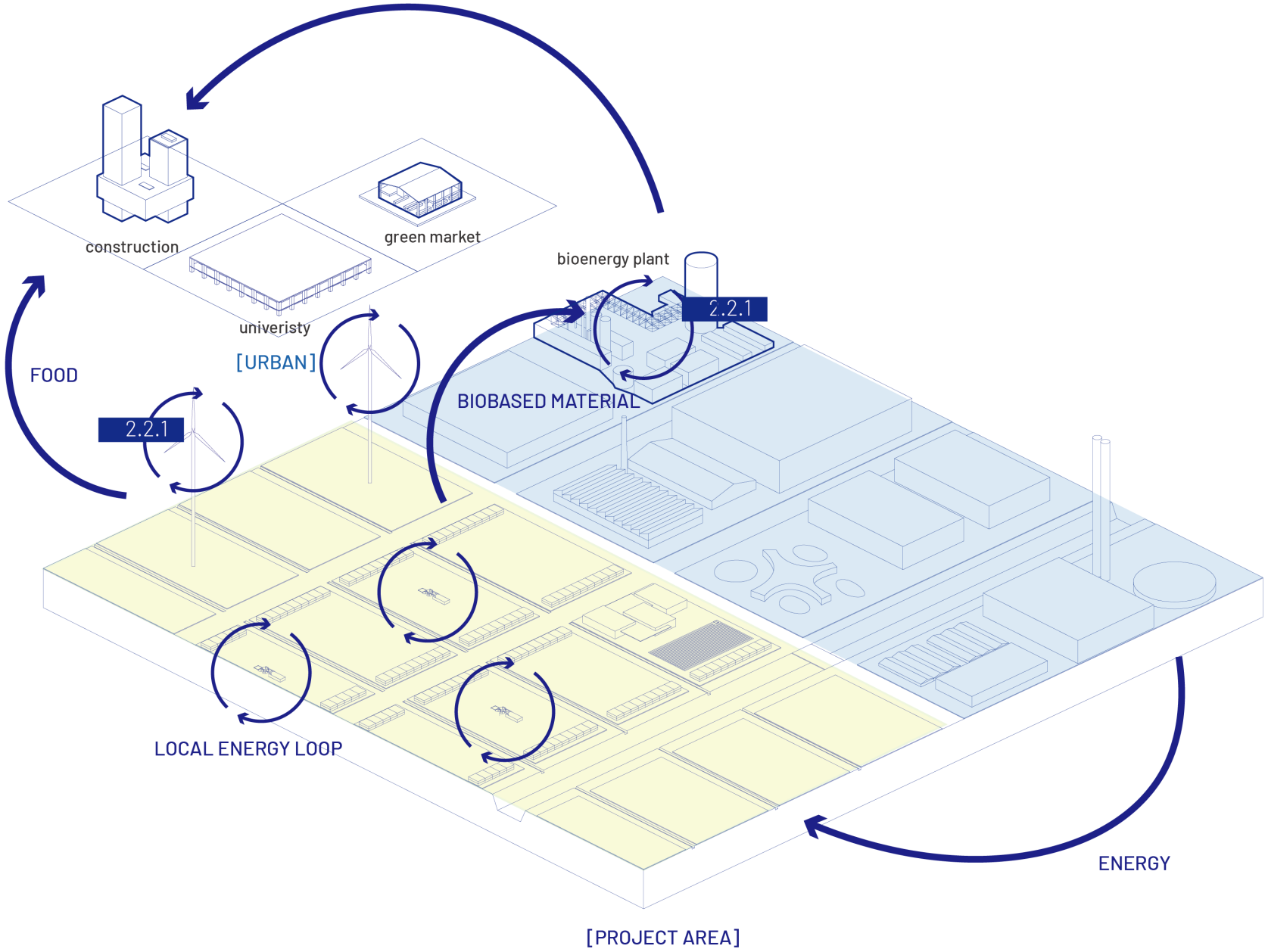


Goal 3

Produce while Regenerating

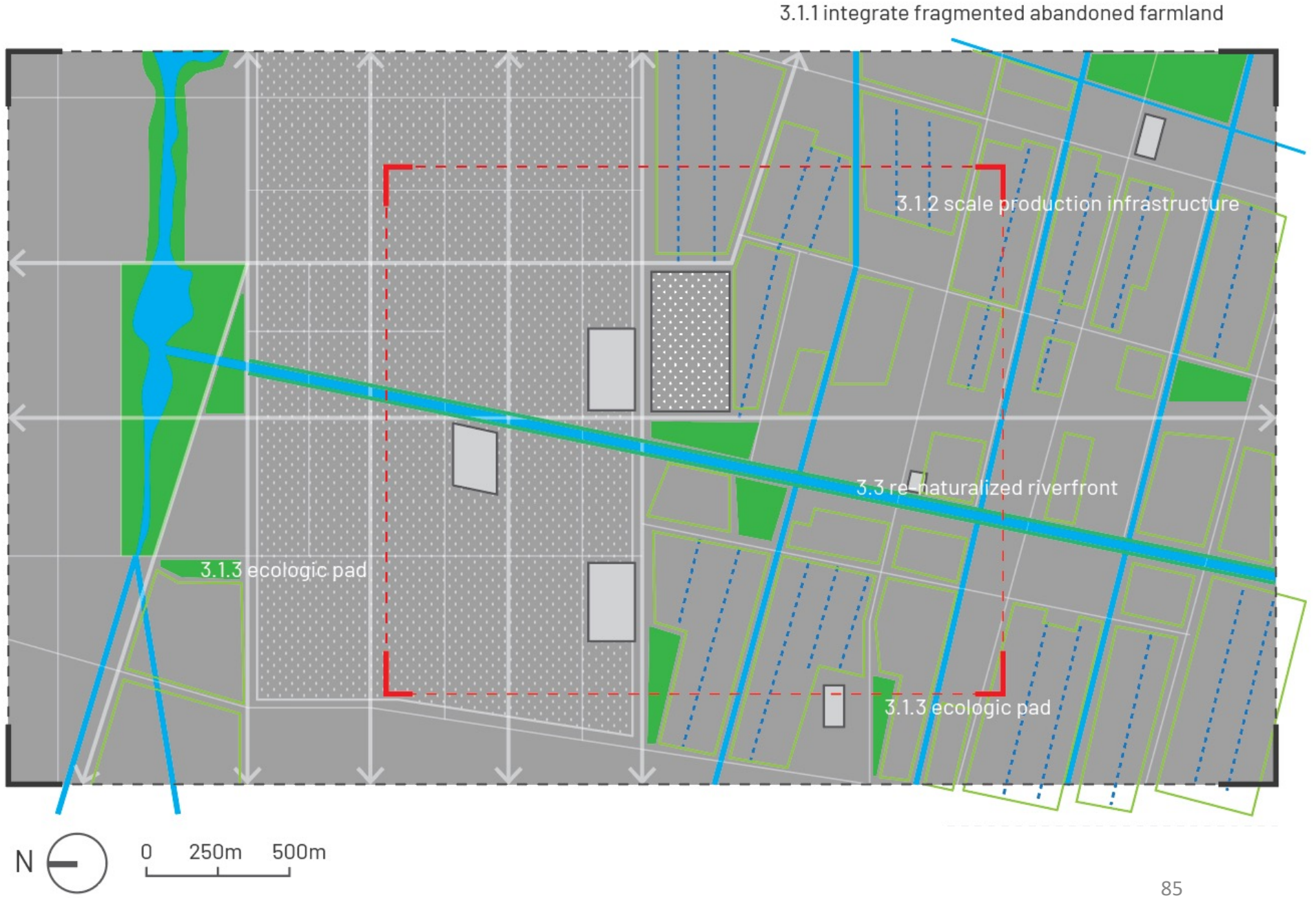
3.1.1 integrate fragmented abandoned farmland into standardized production units(SPU)

3.1.2 introduce scale production infrastructure

3.2 Purify polluted soil through a multi-method approach

3.3.1 naturalize waterfront for soil erosion control and additional recreational purpose

3.3.2 transform redundant farmland as green patches for villagers' recreation and local micro natural system



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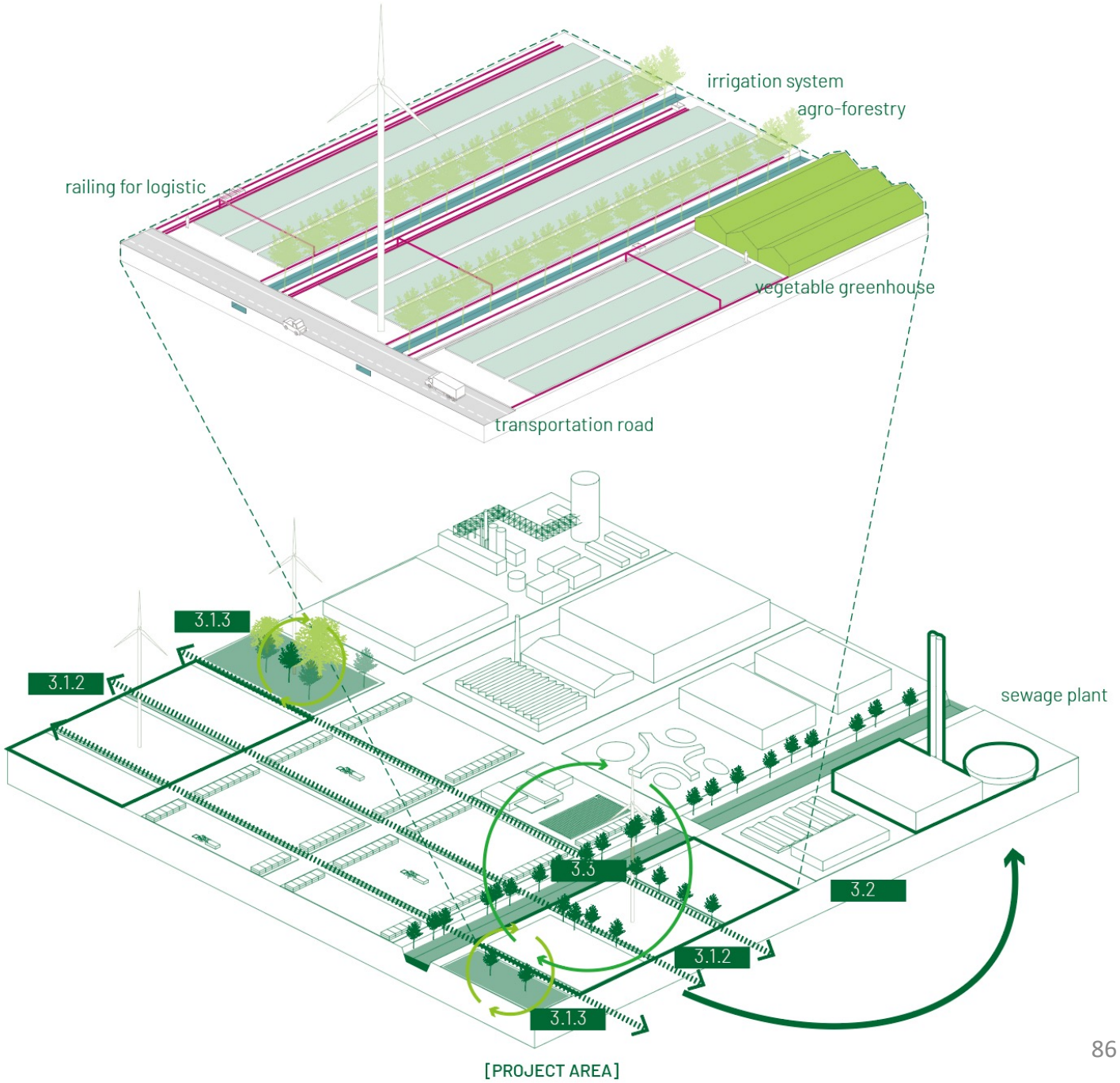

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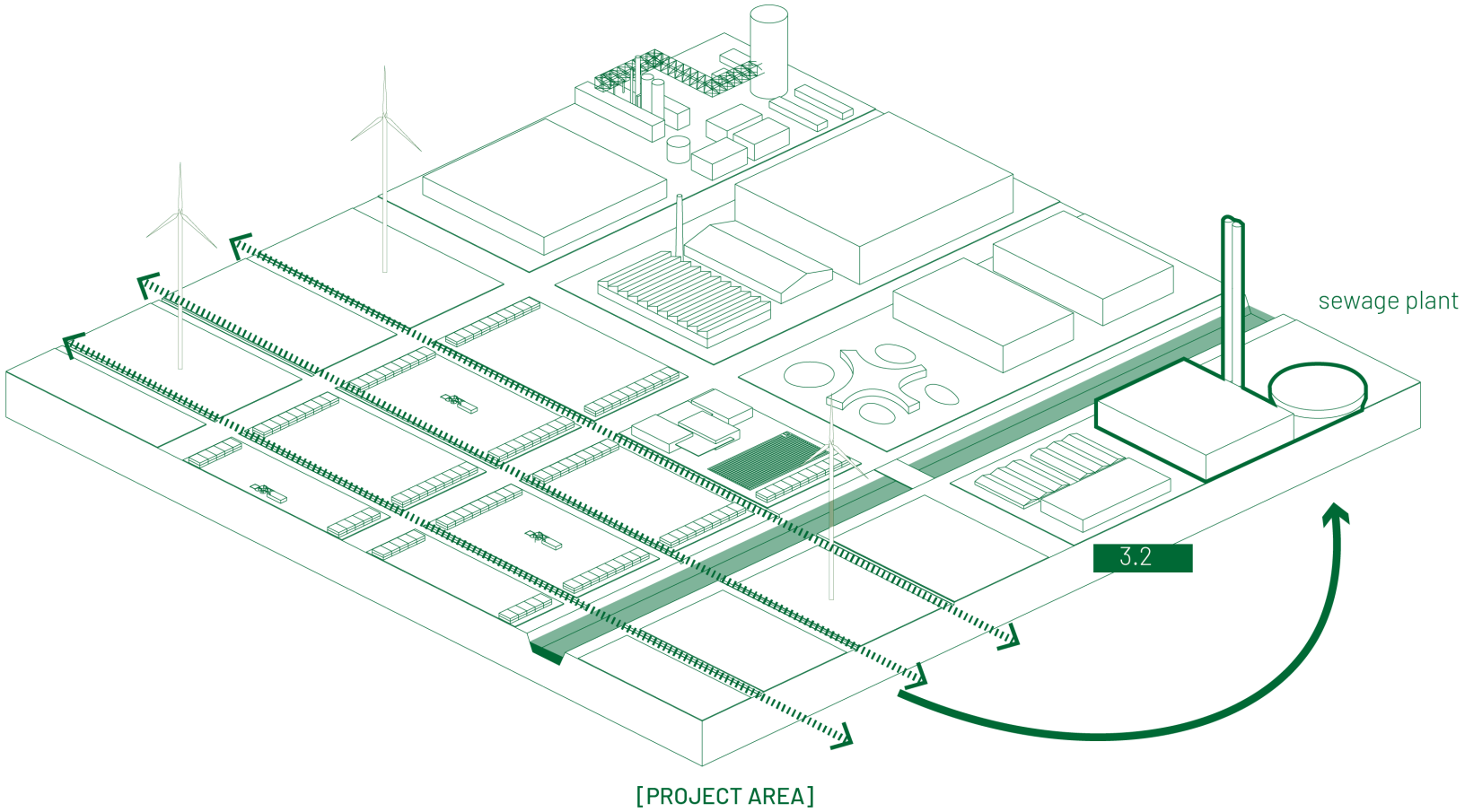

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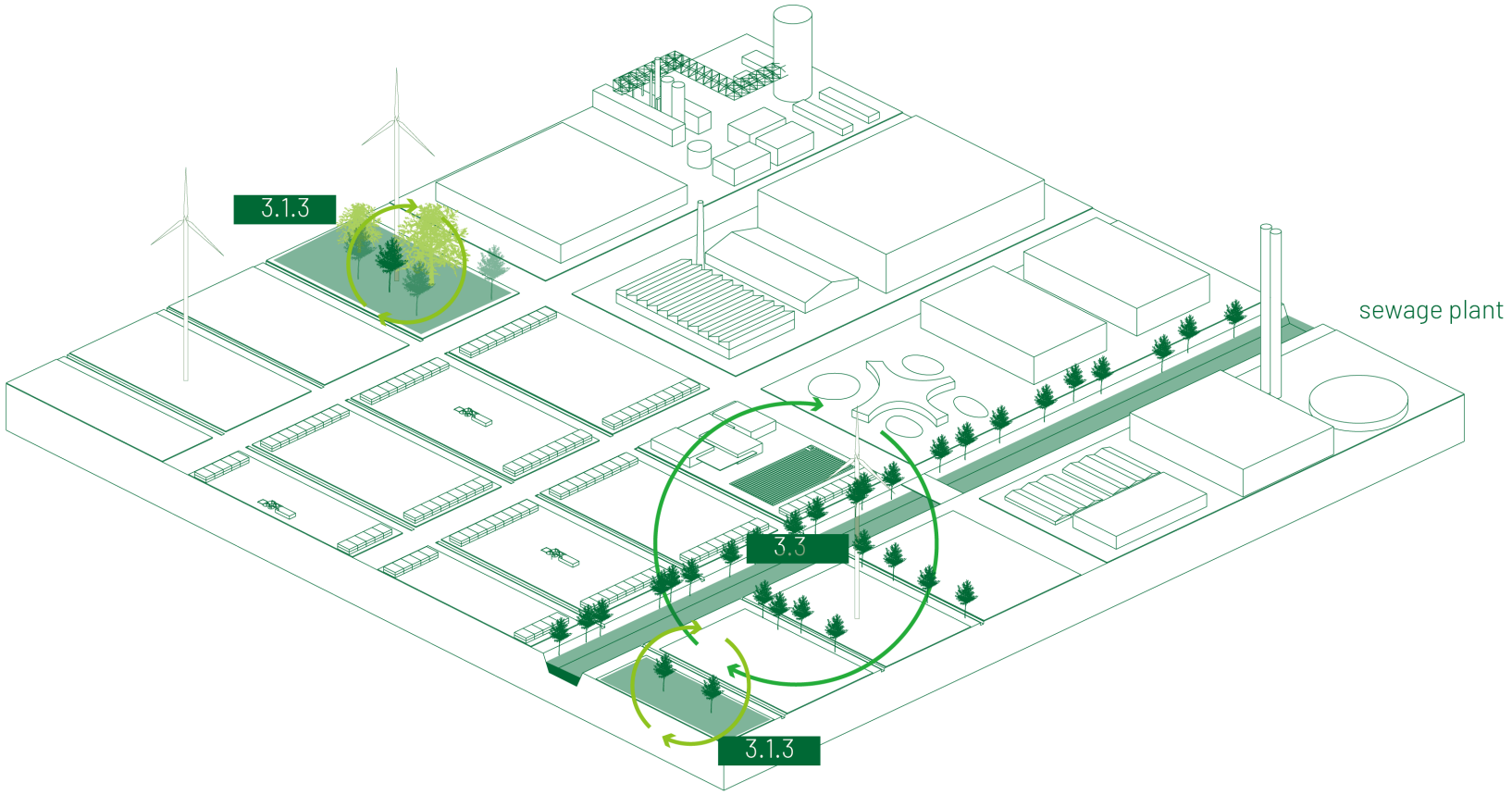
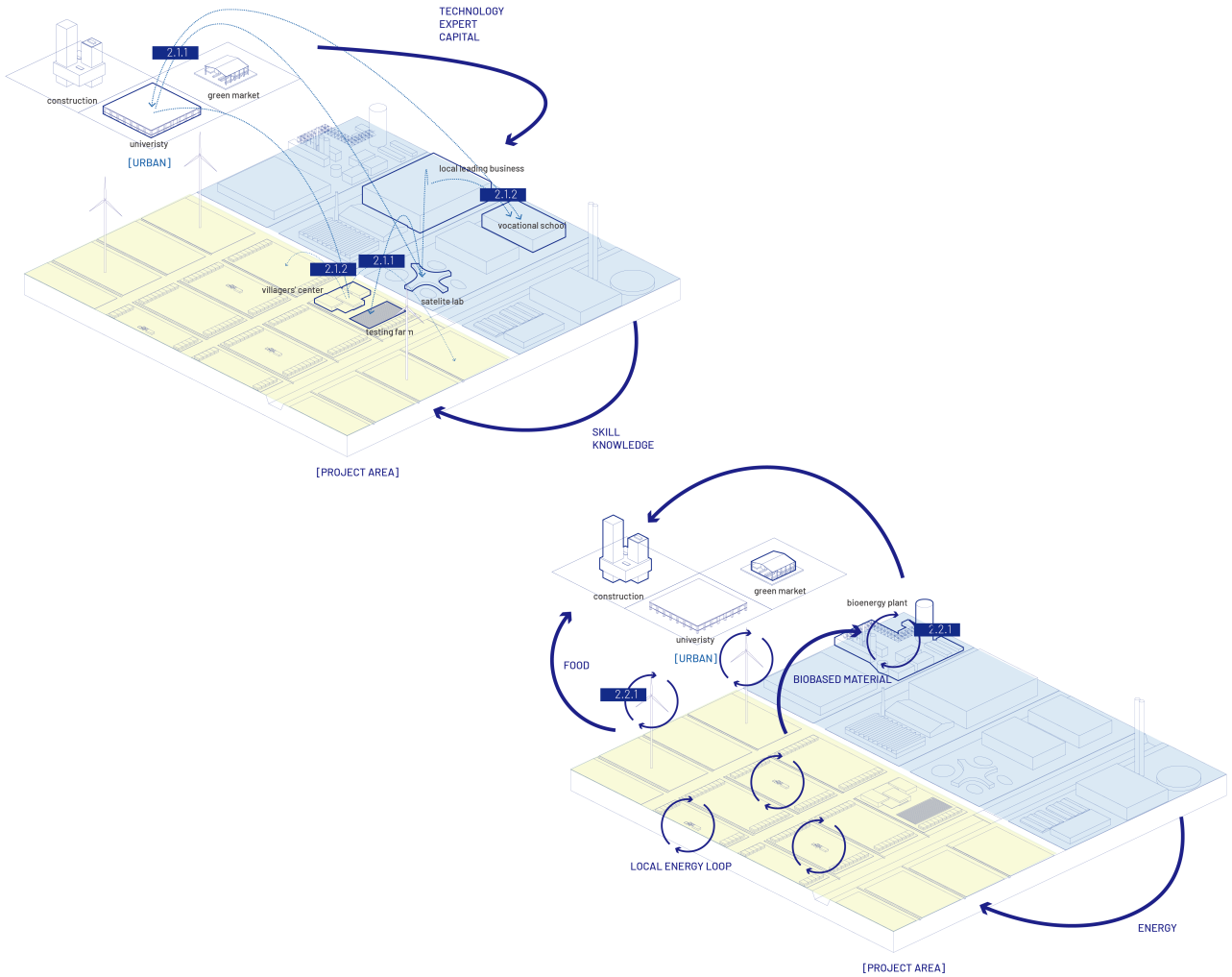


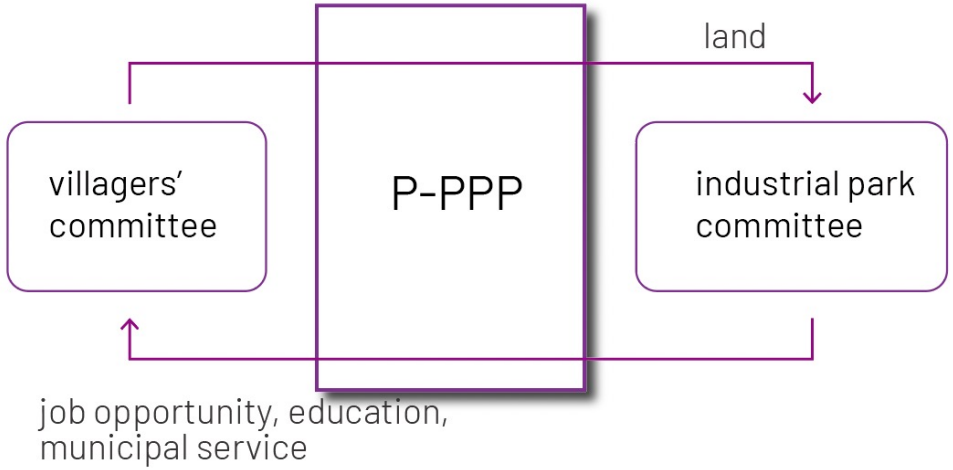
[PROJECT AREA]

Goal 4

Start Here, Start Together

4.1 designing collaboration scheme and secured by PPP





share construction of
- villagers' center
- municipal service
- road and public space
- ... [can be further negotiated]

Goal 4

Start Here, Start Together

4.2 full-spectrum age group consideration

"We can thrive here, no need to leave!": soft infrastructures to serve the local and supported by the region

@villagers' center
courses for kids
workshop for family

kids
companion of parent(s)

@vocational school
circular business training
direct connection with industry

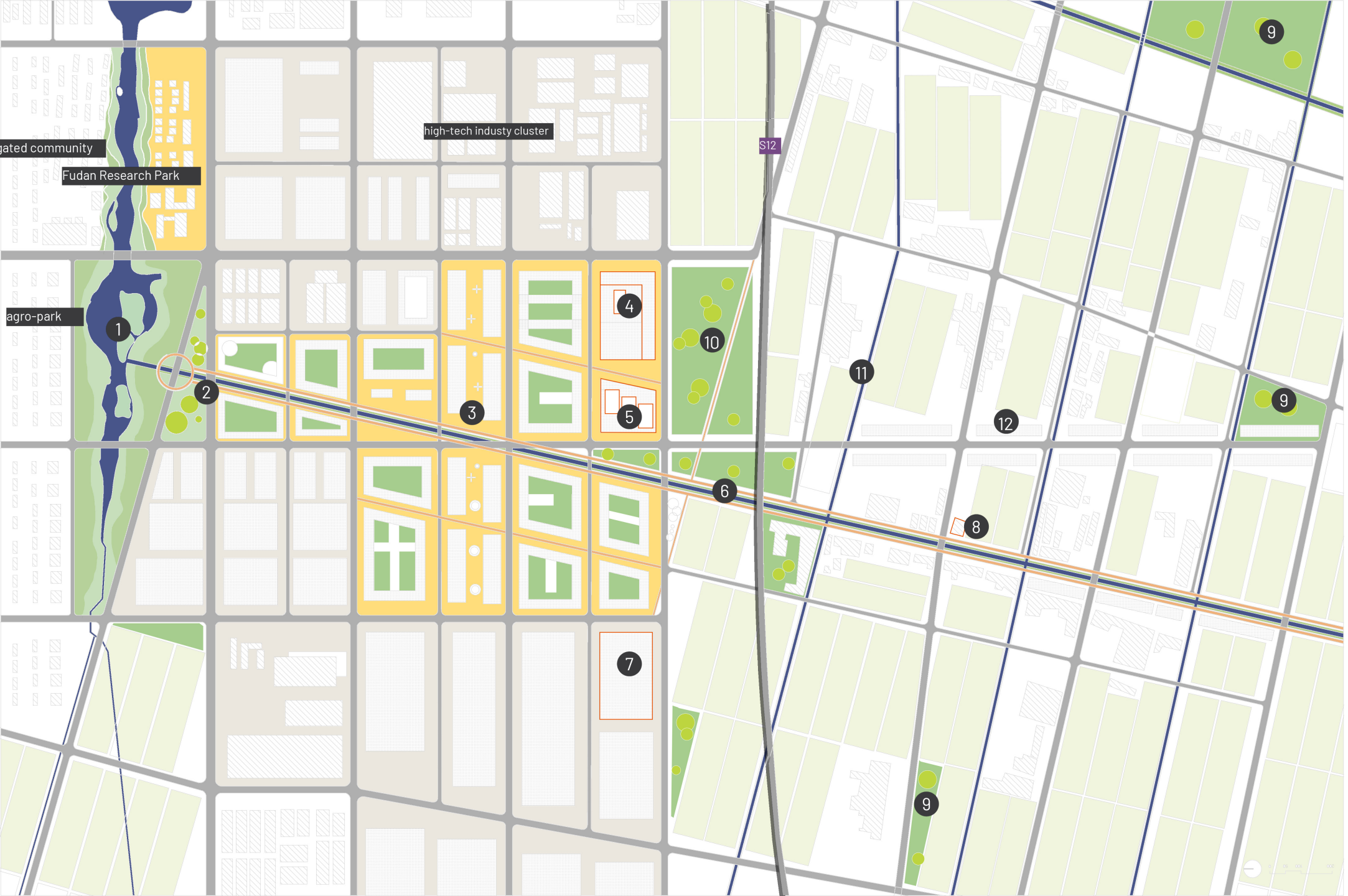
adults
job opportunity

@satelite lab
advanced agriculture
knowledge and skill
on-site research

adults
business opportunity

@quality green
leisure and healthy
environment

the olderly
amenities and environment



1. Fuhe Park
2. pedestrian footbridge
3. hybrid function zone with public service and amenity
4. satellite lab
5. circularity business R&D department
6. re-naturalized riverbank
7. biobased material factory
8. villagers center
9. ecology pad
10. test farm
11. ditch
12. newly built housing

LEGEND

- industrial park
- hybrid function zone
- road
- pedestrian route
- green space
- waterbody
- farmland
- existing building
- newly built
- soft infrastructure

N

0 200m
100m 400m

[A New Urban Edge of Circularity]

DEVELOPMENT PRINCIPLES

PROPOSED INDICATORS

PROSPERITY

A thriving and virtuous cycle of economic activity in the case study area leads to value growth and provides sufficient capital to support quality development.

- Business Investment ▲
- Tax income ▲
- Job Opportunity ▲

LIVABILITY

Pollution control, more greening and activity space, and improved living environment. Create a high-quality living environment so that people want to stay.

- Greenery per capita ▲
- Public service and amenity per capita ▲

SUSTAINABILITY

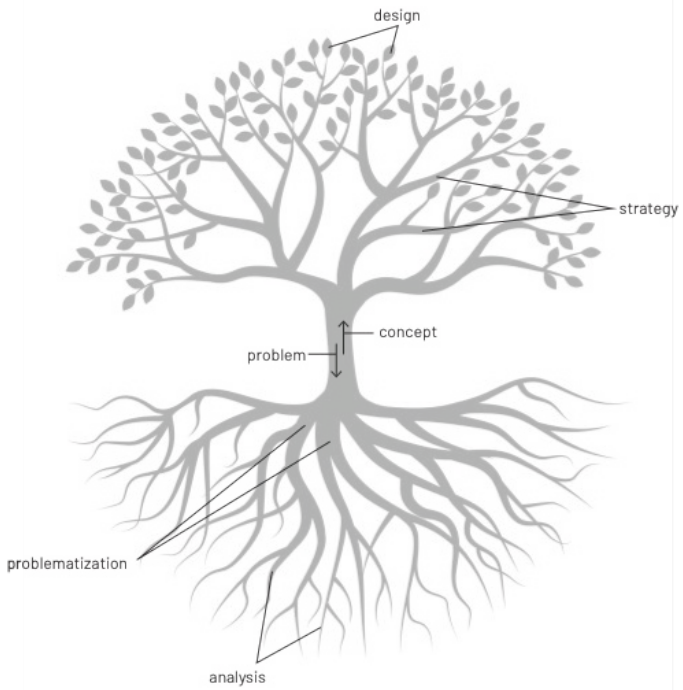
To build a circular economy system, including the use of clean energy to replace traditional thermal power generation, increase the recycling of agricultural residuals, and at the same time regenerate the local ecological system.

- Pollution in the environment ▼
- Renewable energy ratio ▲
- Carbon footprint ▼

SOCIAL JUSTICE

Guarantee a people-oriented reciprocal decision-making process with an organic combination of top-down and bottom-up to achieve fair spatial justice of distribution of amenity and development result.

- Public participation in decision making ▲



research question	sub-questions	working theme	infrastructures worked on	research and design method	product
RQ how PBCT gonna work	SQ1 what they have	analysis & vision	HARD transportation production green and blue SOFT education research civic center ORGANIZATIONAL regulation & policy governance scheme stakeholder engagement	spatial analysis industry analysis stakeholder analysis site visit and interview	strength and opportunity key intervention place vision goals
narrow down subjects of analysis	*establish vision*				
	SQ2 what strategy	strategy GOAL 1 transportation as foundation GOAL 2 resource looping GOAL 3 ecology regeneration GOAL 4 multi-scalar coordinative governance		layer approach space syntax mapping design by research and research by design	railway optimization bus line optimization highway section design surrounding landuse update project fabric optimization research collaboration scheme location of research and education facility energy transition plan location indication for project farm consolidation scheme scale production scheme purification scheme multi-scalar coordination governance bottom-up local empowerment
adjust strategy detail based on local condition	*guide design*				
	SQ3 what local design	test design pt-A pt-B pt-C		design as testing	pilot project design planning - farmland consolidation - industrial park - road system and public transportation - TOD governance - PPP intention draft - empowerment plan

KEY LESSON LEARNED

Planning for circular transition

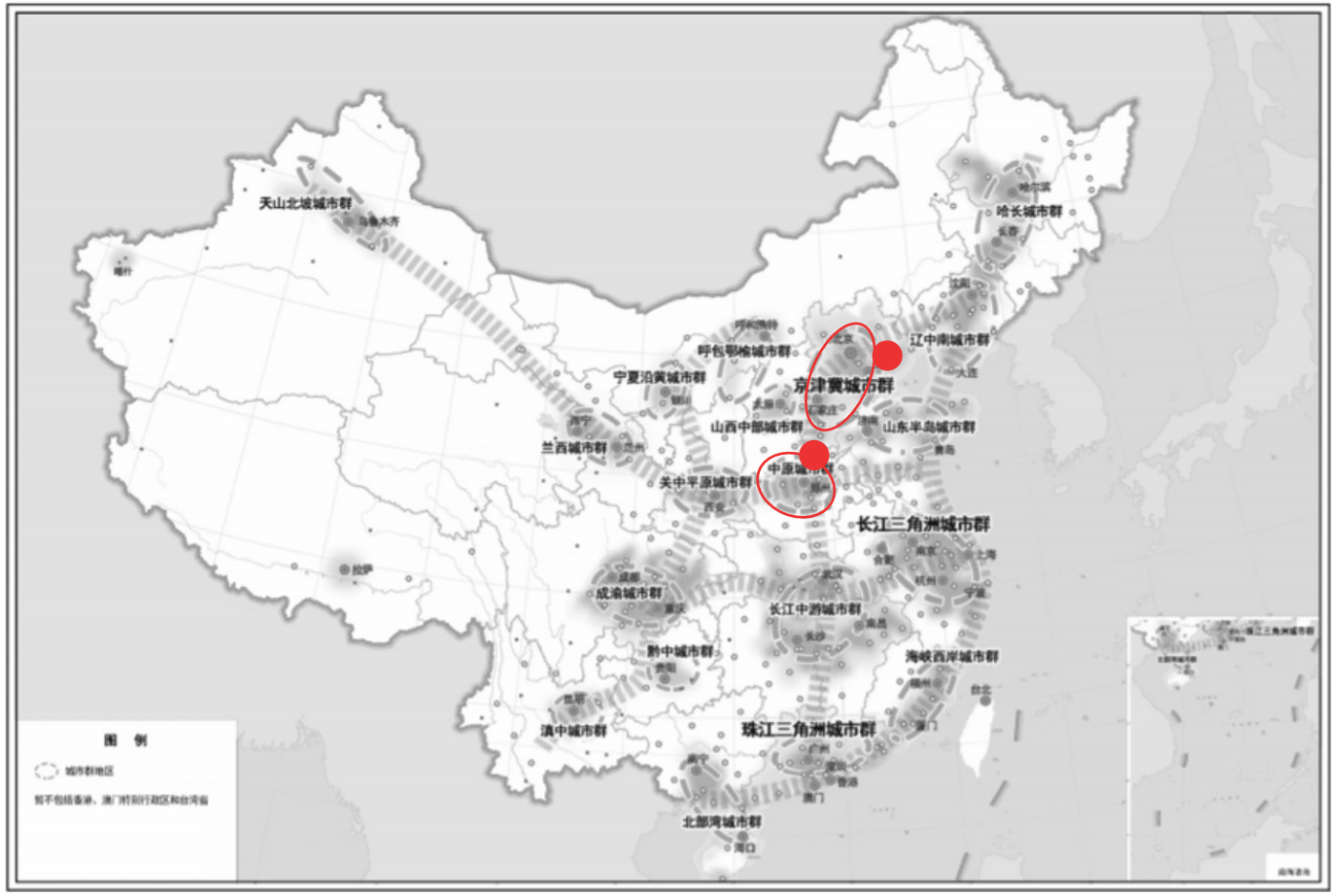
1. Feasibility: understanding systems, designing infrastructure
    1. Reciprocal process
    2. Understand and solve in a systemic way

2. Principle of being place-based
    1. understand local condition
    2. use place as the media to organize systemic strategies in a multi-scalar way

Transferability

Where to transfer:

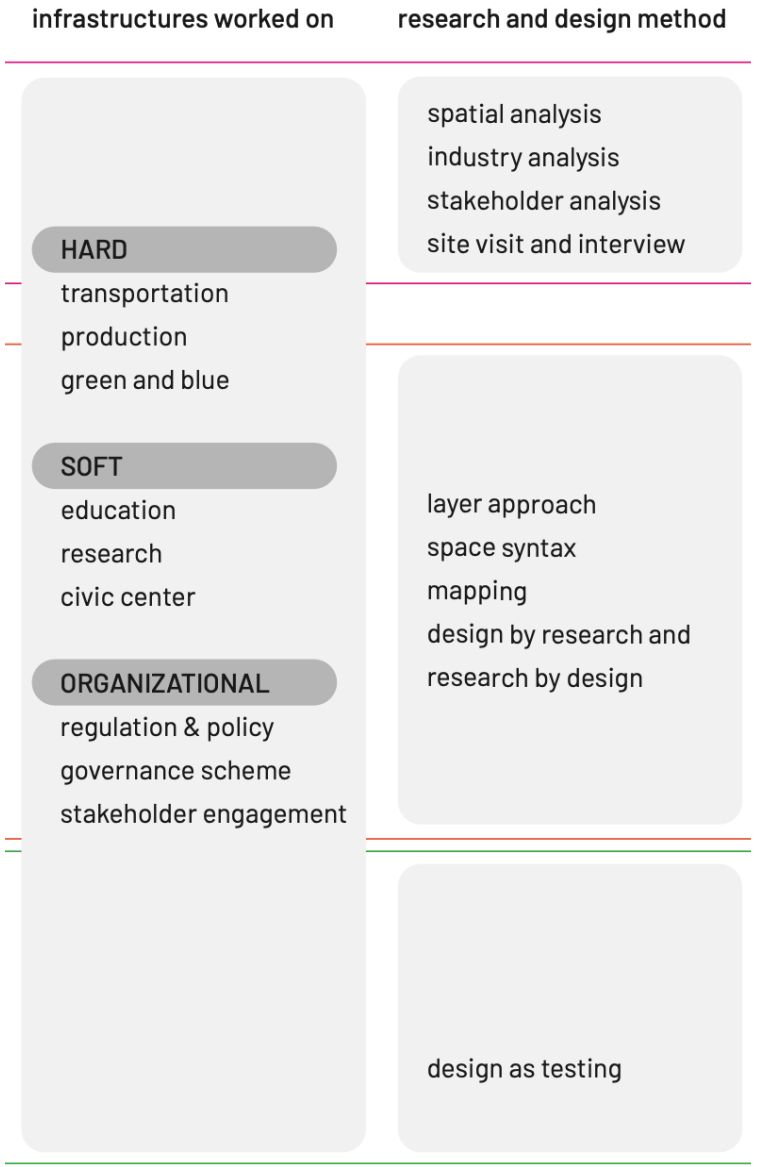
- Rural, periphery region in other urban agglomeration in middle and east China (plain area with strong agriculture and industrial base) such as:
  - North Hebei in Jing-jin-ji
  - Middle China urban agglomeration



Transferability

What can be transfer:

Methodology: infrastructural urbanism



Transferability

What can be transfer:

Methodology: infrastructural urbanism

Goals

GOALS	STRATEGIC OBJECTIVES	IMPLEMENTATION ACTIONS
1. connect for opportunity: strengthen regional connectivity and improve logistic efficiency	1.1 optimize existing transportation infrastructure to align with the development zone and needed connection	1.1.1 add up train connection between Fuyang-Bengbu and upgrade railway tracks between Fuyang-Huaibei 1.1.2 connect border spaces with bus lines (Taihe county-Bozhou, Guoyang county, Wuhe county-Huainan city) 1.1.3 upgrade highway with additional non-vehicle and service to the alongside villages based on angular choice analysis
	1.2 hybridization: connect adjacent transportation points for higher efficient transportation network	1.2.1 extend bus lines around certain train station(Linquan, Gucheng, Tangshan, Huangkou, Guzhen, Liancheng) 1.2.2 road + water: intertwine and weave road and water system through urban design to offer quality open space and efficient amenity spatial distribution
2. go circular and extend: catalyze synergetic development of local agriculture and industry	2.1 establish multi-scalar innovation collaboration as foundation for place-based circular transition	2.1.1 RESEARCH: establish research league for circularity transition AND set up satelite labs in NA with support from top universities in core YRD, collaborating with local leading businesses 2.1.2 EDUCATION: set up knowledge center in local villages, support vocational school launch courses to prepare labour for circular economy
	2.2 Support the phasing out of coal mine industry with agriculture-integrated methods	2.2.1 build wind and photovoltaic generating infrastructures in NA based on energy production potential 2.2.2 introduce circularity business to the coal mine region 2.2.3 offer job education in previous coal mine area in collaboration with new businesses
	2.3 Complete agriculture production value chain with circular production infrastructure	2.3.1 reconstruct road and waterway system in roject area 2.3.2 build biomass and waste processing facilities in industrial park next to agricultural land and villages in project area 2.3.3 add small scale sewage plant in needed villages
3. produce while regenerating: production activities as opportunities to repair and regenerate local eco-system	3.1 consolidate and scale up agriculture production	3.1.1 integrate fragmented abandoned farmland into standardized production units(SPU) 3.1.2 introduce scale production infrastructure (sewing, harvesting, sensoring and watering facility)
	3.2 purfiy polluted soil through a multi-method approach (cover-crop and mine-pit resolution)	3.2.1 adjust local ditch system in a minimized manner to form mine-pit resolution system 3.2.2 introduce purifying crops and plants
	3.3 improve waterfront ecologic sustainability	3.3.1 naturize waterfront for soil erosion control and additional recreational purpose 3.3.2 transform redundant farmland as green patches for villagers' recreation and local micro natural system
4. start here, start together: communitarian governance for realization of place-based circular transition in rural periphery	4.1 establish multi-scalar coordination	4.1.1 set up multi-scalar (NA, city, project area) coordination committee circular transition and development with local political autonomy 4.1.2 people-oriented public-private partnership
	4.2 initiate development momentum at local level	4.2.1 empower rural population through villagers' center and satelite lab for knowledge spreading, information sharing and co-decision making 4.2.2 establish connection between job education and local enterprises through policy support 4.2.3 empower local startups through policy and financial support

Transferability

What can be transfer:

Methodology: infrastructural urbanism

Goals

Partially strategic objectives

GOALS	STRATEGIC OBJECTIVES	IMPLEMENTATION ACTIONS
1. connect for opportunity: strengthen regional connectivity and improve logistic efficiency	1.1 optimize existing transportation infrastructure to align with the development zone and needed connection	1.1.1 add up train connection between Fuyang-Bengbu and upgrade railway tracks between Fuyang-Huaibei 1.1.2 connect border spaces with bus lines (Taihe county-Bozhou, Guoyang county, Wuhe county-Huainan city) 1.1.3 upgrade highway with additional non-vehicle and service to the alongside villages based on angular choice analysis
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Transferability

What can be transfer:

Methodology: infrastructural urbanism

Goals

Partially strategic objectives

Several implementation actions

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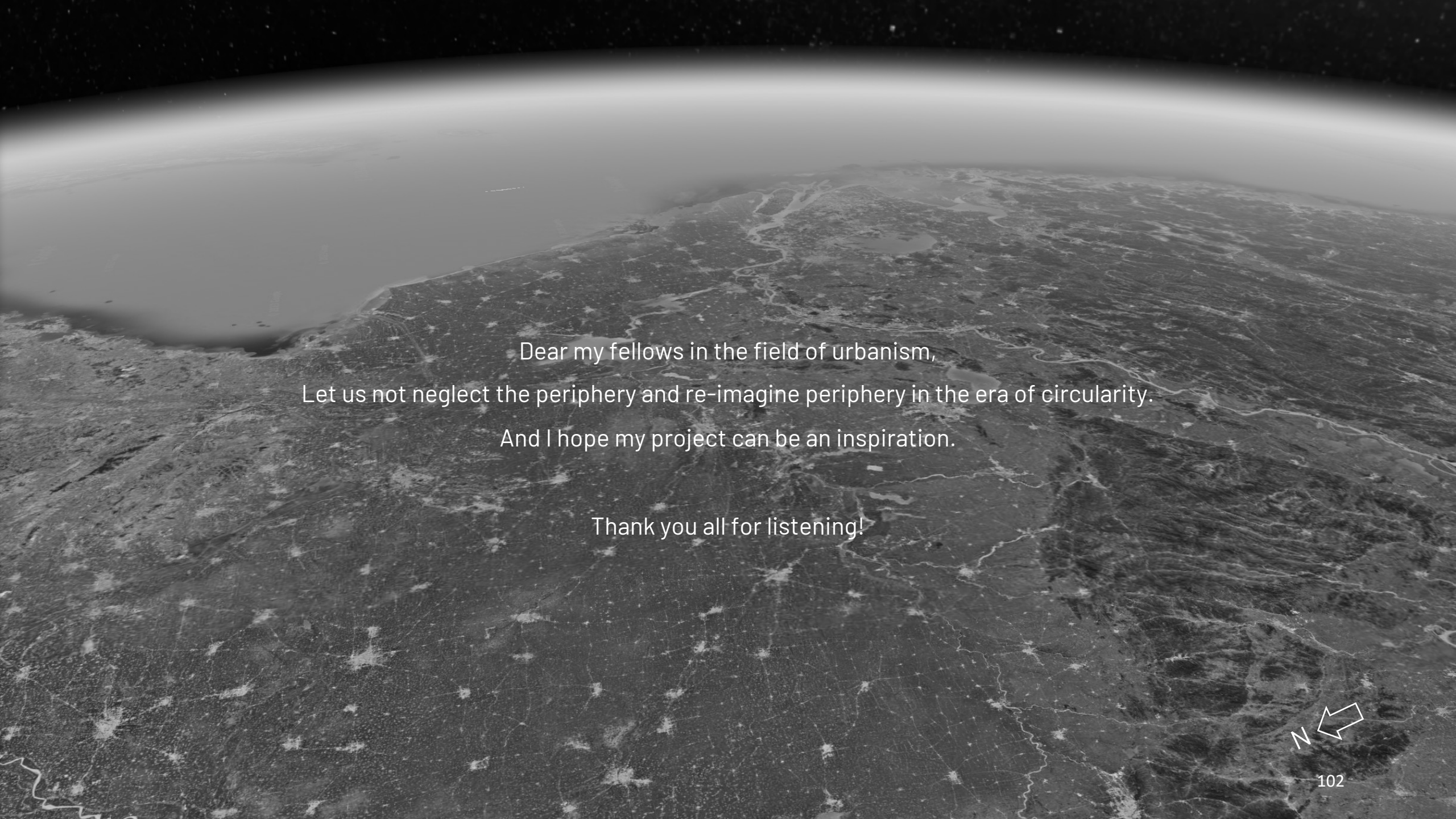
LIMITATION

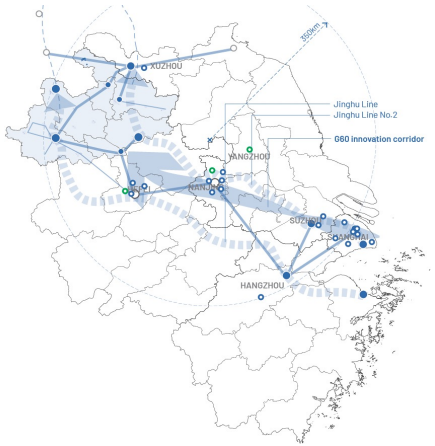
- Lack of understanding of China urban planning system
- Difficulty in getting accurate and up-to-date data
- Lack of understanding Rural China
- Quantifiable Modeling of financialization, job creation...

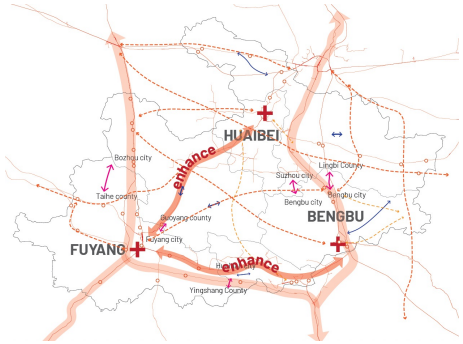
SOLUTION

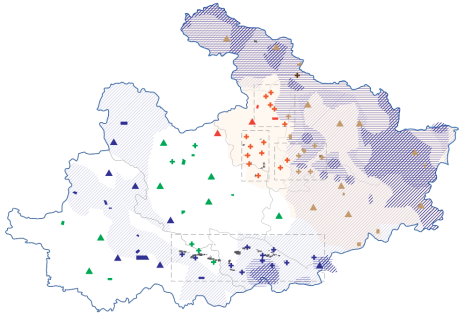
- Creative way of problem solving
    - Space syntax for regional scale
    - Trans-scalar strategy and design
- Literature and educated guess
- Respect and leave space of adjustment during implementation


Dear my fellows in the field of urbanism,
Let us not neglect the periphery and re-imagine periphery in the era of circularity.
And I hope my project can be an inspiration.
Thank you all for listening!
N

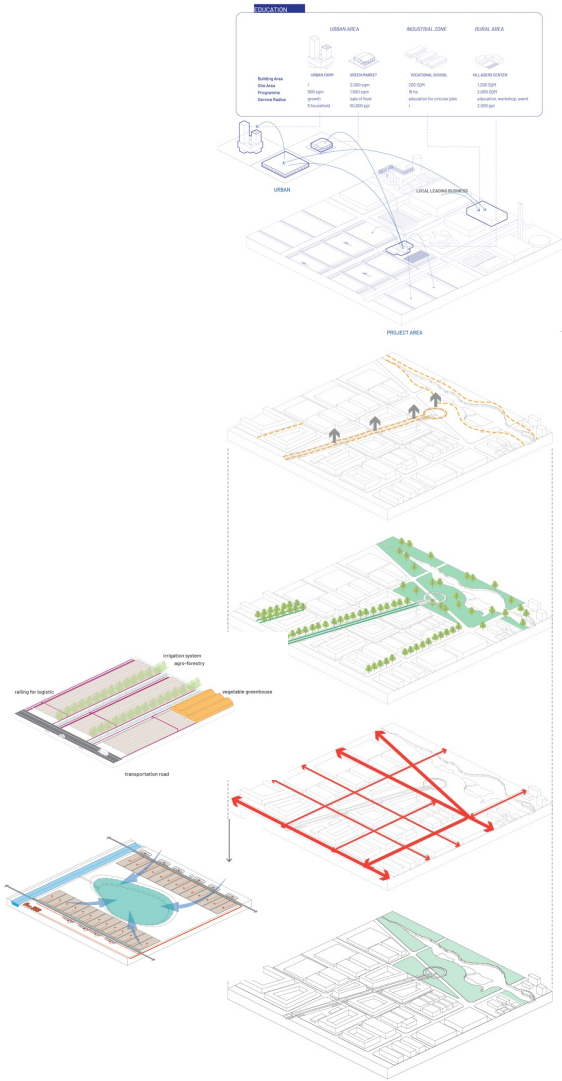
Spatial Strategy - regional







Spatial Strategy – project level



Governance scheme

Yangtze River Delta - regional

Joint Conference on Cooperation and Development in the Yangtze River Delta Region

- China Raiway Corporate
- Administration of Science and Technology
- leading universities
- circular business

north Anhui - provincial

Anhui Provincial Development and Reform Commission

- Administration of Science and Technology of Anhui Province
- Provincial Energy Administration
- coal mine business
- circular business

project area - local

Municipal DRC

- villagers' committe
- industrial park committee*
- Municipal Bureau of Natural Resources and Planning
- real estate developer
- vocational school
- circular business